THE IRON TRADE REVIEW

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January Makes Good Showing in Finished Lines

And Pig Iron is Piling Up in Some Sections—Some Sheet Makers Not Willing to Sever Relations With Jobbers

January has made a good record compared with several preceding months so far as finished materials are concerned, and the outlook for the immediate future is very encouraging. The pig iron situation is not so satisfactory, although there is improvement in some sections of the country. At the present time, the United States Steel Corporation subsidiaries are operating slightly more than 50 per cent of their blast furnace capacity, compared with 46 per cent at about the beginning of the year. It is expected that the active capacity will be increased to about 55 per cent this week. Some independent concerns are also increasing their blast furnace output. The Cambria Steel Co. will probably have all its blast furnaces and 20 of its 24 open-hearth furnaces in operation by Feb. 15. This company will re-enter the market as a manufacturer of wire and wire products in the very near future. Its Johnstown plant was an extensive manufacturer of wire prior to the great flood in 1889.

Sheets and Tin Plate

A sale of over 5,000 tons of sheets at Chicago, at a low price by a Youngstown company, caused some commotion among sheet manufacturers, but investigation developed that the sale was made before the recent meeting of sheet manufacturers, at which the sentiment was strongly in favor of maintaining prices. The resolution adopted by the sheet manufacturers at a meeting held a few days ago in Pittsburg, providing for abolishing the payment of commissions to jobbers, will not be respected by some of the manufacturers, who have found their relations with jobbers very satisfactory. Owing to the recent very rapid advance in the price of pig tin, an advance in the price of tin plate is expected.

Railroad Buying

The announcement of large expenditures to be made by the Harriman system in double-tracking the Union and Southern Pacific from Omaha to the coast has added materially to the already improved sentiment of the steel market regarding railroad buying. These improvements will require large quantities of rails, bridges and other materials. The Harriman lines have bought no rails this year. One eastern independent steel company has booked 100,000 tons of rails during January, and western railroads awarded 35,000 tons of rails the past week. The Chesapeake & Ohio has placed an order for 15,000 tons, and the order for the Boston & Maine, 50,000 tons, is about to be entered. The American Bridge Co. has been awarded 12,000 tons for the Norfolk & Western bridge across the Ohio at Kenwood, W. Va., and has been ordered to fabricate 18,000 tons which work had been held up. The New Haven for the joint railroad bridge at Louisville, on has placed an order for 2,500 tons of bridge material with S. W. Bowles & Co., and the Chicago & Northwestern has ordered 1,500 tons from the King Bridge Co.

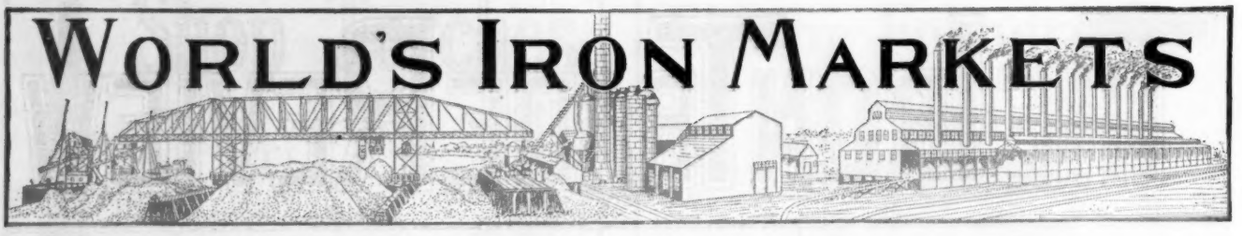
Structural Material

The structural material market is showing improvement. Bethlehem sections will be used in the Insurance Exchange building, Chicago, 14,000 tons, to be erected by the Brown-Ketcham Iron Works, Indianapolis. The steel for the ore boat for the Wisconsin Steel Co., 3,000 tons, has been awarded to the Jones & Laughlin Steel Co. The Pabst Brewing Co., Milwaukee, has awarded 2,000 tons to the Worden-Allen Co. The American Bridge Co. will fabricate from 10,000 to 13,000 tons for the new plant of the Minnesota Steel Co., at Duluth. The Heyworth building, Chicago, 2,200 tons, has been awarded to the Brown-Ketcham Iron Works; the Lincoln high school, Portland, Ore., 1,000 tons, to Milliken Bros.; a loft building, Thirty-sixth street, New York City, to the Hay Foundry & Iron Works; and the Central Union Gas Co. building, New York City, 1,000 tons, to Port & McCord.

Pig Iron

In the east, there has been a considerable increase in activity among pig iron buyers, and in the Philadelphia territory, sales for January have amounted to from 75,000 to 100,000 tons, of which steel-making irons made up about 35,000 tons. Many eastern buyers now seem willing to contract at present prices as far ahead as they can, but sellers are becoming more conservative. Some large buyers are sounding the market in New England, but low prices are still being made. A Buffalo pipe concern has purchased 5,000 tons of lower grades of pig iron. Throughout the central west, the pig iron market is very quiet. An inquiry is pending for a large tonnage of ferro-silicon.

WORLD'S IRON MARKETS



PITTSBURG

Orders for January Show Good Increase Compared With Other Months.

Office of THE IRON TRADE REVIEW,
510 Park Building, Jan. 31.

In point of orders entered on mill books, the iron and steel market in this territory made a better showing in January than in any single month during the second half of 1910, reports of one or two steel companies showing the total tonnage entered during the initial month of the year to have been more than double that of either November or December. There has been no particularly heavy buying from any one source, but orders are coming from a wider range of customers than for several months. Mill operations in this district have been increased accordingly and additional plants will be started shortly. The trade does not expect a heavy buying movement, but looks for a steady, conservative buying by consumers from now on.

At the opening of the new year, prices were fairly firm, although concessions on some finished lines were made on desirable business. During the month, prices on all wire products have been advanced $1 a ton; prices of wire rods have been advanced $1 a ton; low quotations on spikes and track bolts have been withdrawn, and reports of concessions on all other finished steel products have entirely disappeared. Some mills are not accepting orders for steel bars, sheets, tin plate and billets and sheet bars for delivery very far ahead at today's prices.

The Republic Iron & Steel Co., for the first time in several months, is operating its steel mills full time this week. The Cambria Steel Co., Johnstown, Pa., is operating 16 of its 24 open-hearth furnaces and five of its eight blast furnaces, one stack having been blown out last week. This company will start its new wire rod mill about Feb. 15 and its new wire mills about April 1. The Carnegie Steel Co. has also started additional mills. Some large contracts for steel bars have been placed recently, and the market is firm at 1.40c, Pittsburg. Advanced prices on wire products are being maintained and makers of wire rods are quoting from $28.50 to $29, Pittsburg, an advance of $1 a ton. The tin plate market is showing considerable activity and several independent plants are running full time. Reports read at a recent meeting of sheet manufacturers showed heavier specifications and a slight gain in new business. Heavy tonnage of pipe is under active negotiation and mills are operating on a more satisfactory basis than at the beginning of the new year.

The only transaction of importance in the local coke market during the week was the sale of between 15,000 and 20,000 tons of furnace coke for delivery over the next two months. Several sales of pig iron are noted and prices on some grades appear to be firmer. Ten of the 19 merchant furnaces in the valleys are operating. Two furnaces in the Pittsburg territory will be blown in within the next week.

Pig Iron.—While the total tonnage involved in sales of pig iron during the past week does not show a very large gain over the preceding week, developments have been rather encouraging, as consumers who have had occasion to test the market apparently are convinced that sellers will not dispose of their holdings at low prices. Prices generally appear to be firmer than a week ago, and a sale of malleable iron is noted at an advance of 25 cents a ton over the price established by recent sales. It is expected that official reports for January will show that several non-merchant furnaces have been blown in during the past three weeks. The Cambria Steel Co. this week is operating five of its eight blast furnaces, one stack having been blown out last week. Two additional stacks have been blown in at the Ohio works of the Carnegie Steel Co. The Kittanning, Pa., furnace of the Kittanning Iron & Steel Co. will be blown in within the next few days and the Clinton furnace of the Clinton Iron & Steel Co. will be blown in shortly. Ten of the 19 merchant furnaces in the valleys are in operation. Of this number, five are running on basic, two Bessemer, two on foundry and one on gray forge.

The Standard Sanitary Mfg. Co., Pittsburg, has taken about 4,000 tons of foundry iron for delivery at Northside, Pittsburg, and New Brighton, Pa., and another consumer has purchased 500 tons of No. 2 for immediate shipment. While most furnace interests are holding for $14, valley, for No. 2 foundry, sales have been made at $13.75, valley. There has been little trading in gray forge and this market is still quotable at $13.25, valley, for prompt and first half shipment.

A sale of 1,500 tons of malleable to a local consumer at $13.75, valley, is noted. Several sales of this grade in lots of from 1,000 to 5,000 tons each were made recently at $13.25, valley, for prompt and first half shipment. A car manufacturing concern near Pittsburg, which recently closed for 3,000 tons of basic, has also taken 3,000 tons of malleable for first half delivery, and another car company has purchased 1,000 tons of malleable and 1,000 tons of car wheel iron.

No important sales of basic have been reported, although there is considerable tonnage under negotiation. The sale of the Midland furnace of the Midland Steel Co. to the Crucible Steel Co. of America, which will be taken over by the new owners March 1, removes this stack from the list of merchant furnaces. There is considerable basic iron stored at the furnace, which is retained by the Midland Steel Co. The Bessemer market shows no change from a week ago. While the market has not been thoroughly tested, no sales have been reported below $15, valley. We quote the market as follows:

Pig Iron Prices.

(Prompt Shipment.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	13.50
Basic, Pittsburg	14.40
No. 2 foundry, Pittsburg	14.65
Gray forge, Pittsburg	14.15
Malleable, Pittsburg	14.40

(First Half.)

Bessemer, valley	$15.00
Bessemer, Pittsburg	15.90
Basic, valley	13.50
Basic, Pittsburg	14.40
No. 2 foundry, Pittsburg	14.90
Gray forge, Pittsburg	14.15
Malleable	14.40

Ferro-Alloys.—Developments in this market during the past week indicate

that consumers of 50 per cent ferro-silicon realize that prices have reached bottom, as one or two inquiries involving exceedingly heavy tonnage for delivery over the entire year are pending. Odd lots for immediate shipment have been sold at $56, Pittsburg, although $55, Pittsburg, is being done on large lots for forward delivery. Consumers of ferro-manganese are well covered and few sales have been reported. The market is not very firm at $38, Pittsburg.

We quote ferro-manganese at $38, Baltimore, for prompt and first half of 1911. The freight rate from Baltimore to Pittsburg is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $55. Pittsburg, for prompt and first half; 12 per cent, $25; 11 per cent, $24; 10 per cent, $23, f. o. b. Jisco and Ashland furnaces. The freight rate to Pittsburg is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

Plates.—Miscellaneous business in plates this week has been moderately heavy, although no large awards have been made. Steel companies in this territory are now receiving specifications against contracts previously placed, the business being well distributed, with the result that mills are operating on a slightly better basis and manufacturers are more optimistic. One of the disappointing features in this market is that there have been comparatively few awards for cars placed so far this year, final action being postponed on a number of the inquiries noted recently. Reports of price concessions have entirely disappeared. We quote the market as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches, 1.40c. Extras are as follows, per 100 pounds: Boiler and flange steel plates, 0.10c; A. B. M. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.20c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches excepting straight taper plates varying not more than 4 inches in width at ends, narrowest end not being less than 30 inches, 0.10c; circles, 0.20c. Plates in widths over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1c. Gages under ½ inch to and including 3-16 inch plate on thin edge, 0.10c; under 3-16 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms net cash in 30 days.

Sheets.—Reports read at a well-attended meeting of manufacturers of sheets at the Fort Pitt hotel, Pittsburg, Jan. 25, showed considerable improvement in the market as compared with the corresponding period of last month. In addition to the heavier specifications, reports made by manufacturers showed a slight gain in new business. One of the questions discussed at the meeting was the policy of a few manufacturers in paying commissions to jobbers on galvanized sheets and it was agreed to discontinue this policy. One of the encouraging features of this market is that automobile manufacturers are calling for heavy shipments. We quote prices as follows, with $1 a ton added as the delivered price in the Pittsburg district:

Blue annealed sheets, No. 10 gage, 1.65c; box annealed sheets, No. 28 gage, 2.20c; galvanized sheets, No. 28 gage, 3.20c; painted roofing sheets, 1.55c per square for No. 28 gage, 2½-inch corrugation; galvanized roofing sheets, 2.75c per square for No. 28 gage, 2½-inch corrugation.

Tin Plate.—This market continues to make an exceedingly good showing for this season of the year, and it is estimated that tin mill operations have been increased upward of 40 per cent during the past two weeks. Independents are operating at between 80 and 85 per cent of their total capacity and the leading interest is operating more mills than for some months. Large consumers who are covered only for first half are endeavoring to cover for their full requirements as far ahead as possible at present prices, but manufacturers are not inclined to accept orders for delivery very far ahead at today's prices, and it is believed that a new card will be issued in the near future. Estimates have been prepared on a total of 18 new tin mills in this territory, but plans have not advanced far enough to permit publication. The base price on tin plate is as follows:

Coke tin plate, 10-pound basis, 14 x 20, $3.60, f. o. b. mill, Pittsburg district.

Rails and Track Material.—Steel mills are receiving specifications against the New York Central, Pennsylvania and Western Maryland railroad orders for standard steel rails, and are operating on a more satisfactory basis than for some time. In addition to the large orders placed recently, awards have also been made by a number of the small lines and the outlook is regarded as promising. Orders for light rails are being placed by southern foundry interests and other users, although the total tonnage received so far is not very heavy. There has been fairly heavy buying of spikes and track bolts and the higher prices announced last week are being maintained by all mills. We quote the market as follows, the base price on open-hearth rails being 1.34c per pound, at the mill:

Fifty-pound and heavier, 1.25c per pound; car-loads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, $26.50 to $27, the schedule on the other weights being irregular and subject to negotiations; angle splice bars for standard sections, 1.50c, Pittsburg; standard spikes, 1.55c, Pittsburg, for first quarter and 1.60c, Pittsburg, for forward delivery; hand spikes, 1.65c, Pittsburg, for immediate shipment, and 1.70c, Pittsburg, for forward delivery; track bolts, 2.30c, Pittsburg.

Steel.—Shipments of billets and sheet bars in January have been much heavier than expected at the beginning of the new year, and show a gain over any single month since June, 1910. As all large consumers are covered by contract, trading in the open market is confined to lots of from 200 to 500 tons each. Some mills in this territory are behind in shipments, but are not operating to capacity. Prices are firmer than for several months, and some mills are not accepting business for delivery very far ahead at today's prices. Odd lots of forging billets for immediate shipment have been sold at $28, Pittsburg, but one or two mills are not accepting business for forward delivery at this figure. We quote the market as follows:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $23, with the usual extras for size and analysis, and open-hearth rolling billets, $23. Forging billets are quotable at $28, Pittsburg. Bessemer sheet and tin bars are quoted at $24, and open-hearth sheet bars are quoted at $24, makers' mill, Pittsburg or Youngstown, with full freight to destination added.

Hoops and Bands.—Cooperage interests are specifying more liberally, although new business is not very heavy. Local makers of hoops and bands are operating their plants on a slightly better basis than last month. We quote the market as follows:

Hoops in carload lots, 1.50c; in less than carload lots, 1.65c; bands, 1.40c, base, with net extras, as per standard steel.

Merchant Bars.—Specifications from farming implement manufacturers, railroads and other sources in January have been considerably heavier than expected at the beginning of the year. In addition to the heavier specifications, some strictly new business is appearing and additional mills have been started. The market on steel bars is firm at 1.40c, Pittsburg, and some mills are not selling very far ahead at this price. Mills in this territory also report an increase in specifications for bar iron, although new business is light. Automobile manufacturers and other consumers of shafting are specifying more liberally, although mills can handle much larger tonnage. We quote the market as follows:

Common iron bars, 1.35c to 1.40c, Pittsburg; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator, 1.40c; channels, angles, zees, tees, under 3-inch, 1.50c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds of a size, 0.35c advance. Cold rolled and ground shafting, 55 per cent in carloads and 50 per cent in less than carloads, delivered in base territory.

Muck Bar.—This market is still very quiet, sales and inquiry being light. We quote the best grades of muck bar nominally at $29, Pittsburg.

Structural.—Steel mills report a fair run of orders for plain material in connection with recent structural awards, but bookings in this territory have been light. Bids will in all probability be asked shortly on two or three building projects in the immediate Pittsburg district, outlined recently, involving approximately 10,000 tons of steel. We quote the market as follows:

Beams and channels, 15 inches and under, 1.40c; over 15 inches, 1.50c; zees, 1.40c; tees, 1.45c; angles, from 3 to 6 inches, 1.40c; over 6 inches, 1.50c; universal and sheared plates, 6¼ inches wide and wider, 1.40c.

Merchant Pipe.—The aggregate tonnage of miscellaneous pipe business booked in January shows a gain over the preceding month, and February will open with mills operating on a more satisfactory basis than for some time. The Tri-County Natural Gas Co. has again asked for bids on approximately 80 miles of from 3 to 10-inch steel line pipe and bids will close tomorrow on the inquiry of a local gas company for approximately 5,000 tons of casing and line pipe. In addition, fairly heavy tonnage of 12, 14 and 16-inch steel pipe is under active negotiation. Demand for iron pipe is not very heavy. Prices are firm. We quote the following official discounts in carload lots, subject to the usual preferential discount to the larger buyers, merchant pipe, where specified, being offered in from ⅛ to 6 inches:

Iron and Steel Basing Prices.

	Steel.		Iron.	
	Butt weld.			
	Black.	Galv.	Black.	Galv.
⅛, ¼, ⅜ inch	72	58	68	54
½ inch	75	63	71	59
¾ to 1¼ inch	79	69	75	65
2 to 3 inches	80	70	76	66
	Lap weld.			
2 inches	76	66	72	62
2½ to 4 inches	78	68	74	64
4½ to 6 inches	77	67	73	63
7 to 12 inches	75	59	71	55
EXTRA STRONG, PLAIN ENDS.				
	Butt weld.			
⅛, ¼, ⅜ inch	69	59	65	55
½ inch	74	68	70	64
¾ to 1¼ inch	78	72	74	68
2 to 3 inches	79	73	75	69
EXTRA STRONG, PLAIN ENDS.				
	Lap weld.			
2 inches	75	69	71	65
2½ to 4 inches	77	71	73	67
4½ to 6 inches	76	70	72	66
7 to 8 inches	69	59	65	55
9 to 12 inches	64	54	60	50
DOUBLE EXTRA STRONG, PLAIN ENDS.				
	Butt weld.			
¼ inch	64	58	60	54
¾ to 1¼ inch	67	61	63	57
2 to 3 inches	69	63	65	59
DOUBLE EXTRA STRONG, PLAIN ENDS.				
	Lap weld.			
2 inches	65	59	61	55
2½ to 4 inches	67	61	63	57
4½ to 6 inches	66	60	62	56
7 to 8 inches	59	49	55	45

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

Boiler Tubes.—As a result of the more general buying of locomotives, demand for locomotive boiler tubes is heavier and specifications show a slight gain. We quote the market as follows:

	Steel.	Iron.
1 to 1¼ inch	49	43
1¼ to 2¼ inch	61	43
2¼ inch	63	48
2¾ to 5 inch	69	55
6 to 13 inch	60	43

2½ inch and smaller, over 18 feet, 10 per cent net extra.

2¾ inch and larger, over 22 feet, 10 per cent net extra.

To destination east of the Mississippi river will be sold at delivered discount for carloads lowered by two points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburg.

Wire Products. — The advanced prices on wire products, which became effective Jan. 20, are being maintained by all mills, several orders for one and two carload lots each at prices in effect at the opening of the new year having been rejected by the local makers. The new wire mills of the Cambria Steel Co., Johnstown, Pa., with a capacity of from 300 to 350 tons per day, will be placed in operation about April 1. The old Cambria Iron Co. operated one of the largest wire mills in the country prior to the Johnstown flood, but the plant was entirely destroyed by the big flood in the spring of 1889. The completion of the new wire mills will mark the re-entrance of the Cambria Steel Co. in the field as a manufacturer of wire products. Investigation shows that the advance of $1 a ton on all wire products has brought out heavier specifications against running contracts, and there has been some strictly new business placed at the advanced prices. We quote the market as follows:

Wire nails, jobbers' carload lots, $1.75; retailers' carload lots, $1.80, cut nails, jobbers' carload lots, $1.65 to $1.70; painted barb wire, jobbers' carload lots, $1.75, retailers' carload lots, $1.80, with 30c for galvanizing; plain wire to jobbers in carloads, $1.55, and to dealers, in carloads, $1.60, polished staples, $1.75; galvanized staples, $2 05.

Wire Rods.—As a result of the greater activity in the market on wire products, which has resulted in the advance of $1 a ton, makers of wire rods have withdrawn low quotations noted recently. At the opening of the new year wire rods were selling around $27.50, Pittsburg. Last week prices were advanced 50 cents a ton and this week sales are reported at $28.50, Pittsburg, although some mills are holding for $29, Pittsburg. We quote the market at $28.50, Pittsburg, for both Bessemer and open-hearth rods.

Coke.—The initial month of the year has been an exceedingly quiet one as far as the coke market is concerned. Prices on furnace coke have shown little change during the month, although sales of foundry coke for first half have been made at about 25 cents a ton below the prices quoted on Jan. 1. A furnace interest near Pittsburg has closed for its coke requirements over February and March, aggregating between 15,000 and 20,000 tons. The coke figures in an exchange deal and the price paid has no bearing upon the market. Several furnaces in this territory have not bought their February coke and as a result more general buying is expected during the next 10 days, although sellers and producers generally do not expect any material improvement for a few months at least. While sales of furnace coke have been made as low as $1.40, ovens, for prompt shipment, a number of sellers are holding for $1.50, ovens. We quote standard Connellsville furnace coke for prompt shipment at from $1.40 to $1.50, ovens, and for first half at $1.60, ovens. On high grade Connellsville foundry coke, we quote, from $1.95 to $2, ovens, for prompt delivery; for first half at from $2 to $2.50, ovens. The Connellsville *Courier's* figures for the week ending Jan. 21, show 22,663 active ovens with an output of 287,475 tons, as compared with 22,632 active ovens and a production of 280,320 tons the previous week.

Old Material.—Shipments of scrap to furnaces have increased during the past week and in several instances consumers have opened negotiations for their requirements over the next several months, as it is believed that prices will not go any lower as a result of the firmer tone noted in the steel market. Dealers are not inclined to sell very far ahead at today's prices and in a few instances low quotations on certain grades have been withdrawn. The railroads in this territory are expected to put out their usual monthly scrap lists some time this week. Heavy melting steel is still selling around $13.25 to $13.75. There is a fair offering of bundled sheet scrap and several sales have been made at $10.25. Practically all trading is still being confined to small lots. We quote, gross tons, delivered in the Pittsburg district, including Monessen, Sharon, Steubenville, Brackenridge and Follansbee, as follows:

Heavy melting scrap	$13.25 to 13.75
Rerolling rails	14.50 to 15.00
Bundled sheet scrap	10.00 to 10.50
Iron axles	24.00 to 24.50
Old iron rails	15.00 to 15.25
No. 1 wrought scrap	13.50 to 14.00
Old car wheels	13.25 to 13.75
Low phosphorus	17.00 to 18.00
Machine shop turnings	9.25 to 9.50
Cast borings	8.50 to 8.75
No. 1 cast scrap	13.75 to 14.00
Malleable	13.00 to 13.50
Stove plate	11.00 to 11.50

The old plant of the Diamond State Steel Co., Wilmington, Del., which has been idle for seven years, will likely be torn down and the equipment sold for scrap.

CHICAGO

Finished Lines Continue to Improve, But Pig Iron is Dull.

Office of THE IRON TRADE REVIEW,
1328 Monadnock Block, Jan. 31.

There has been no pause in the improvement in finished materials during the past week, but the pig iron market still remains practically lifeless. The principal activity is confined to rails, plates, shapes and wire, but some increase in business is also noted in sheets. The total amount of structural contracts let in the west last week was 21,280 tons, the most important being an order from the Minnesota Steel Co. to the American Bridge Co., calling for 13,000 tons for new buildings. Railroad buying is improving. Western railroads have ordered 35,000 tons of standard section rails and the bookings of plates, shapes and bars by the leading interest were 25,000 tons, of which 12,000 tons are plates ordered principally by car-building companies. Included in the car orders which have been placed are 1,000 refrigerator cars for the American Refrigerator Transit Co. and 500 refrigerators for the Chicago, Burlington & Quincy railroad. After a week of quiet more activity is noted in the cast iron pipe market, contracts let during last week in this territory amounting to 5,250 tons.

Pig Iron.—The week just passed was probably the quietest that has been experienced by local pig iron sellers since the present period of dull business commenced. Improvement in the steel trade has not, up to date, had any material effect on pig iron sales, although there is somewhat better feeling in the market. Local reports to the effect that the Grand Crossing Tack Co. recently purchased 10,000 tons of basic are officially denied. Other sales of basic which have been reported cannot be confirmed. There is a fair scattering of sales to foundry interests, although practically no single purchase amounts to over 300 tons. Nevertheless, including northern, southern and charcoal iron, it is safe to say that 15,000 tons were disposed of in the Chicago market in this manner during the week. Several inquiries for second half are noted, including one from a local pipe maker, and it is probable that if definite propositions could be obtained from furnaces, considerable business would result. Furnace interests, however, are very reluctant to quote beyond June 30 on account of the uncertainty of the price of ore. The Iroquois Iron Co., represented by Rogers, Brown & Co., will blow out one of its stacks at South Chicago probably this week.

We quote the market, f. o. b. Chicago, as follows:

(Prompt shipment and first quarter.)

Lake Superior charcoal	$17.50
Northern foundry No. 2	15.50
Southern foundry No. 2	15.10
Southern silveries, 5 per cent silicon	16.35
Jackson Co. silveries 8 per cent	19.40
Malleable Bessemer	15.50
Alabama basic	15.10

Billets.—The demand in this territory for billets either for forging or other purposes is moderate at present. We quote, open-hearth forging billets, $28, f. o. b. Chicago.

Merchant Bars.—Bar iron mills in the Chicago territory are operating at about 65 per cent capacity. Business is increasing slowly. Prices have not shown any strength, however, although some makers think the market is in shape for an advance. Specifications against contracts for steel bars have improved slightly, but new business is still comparatively light. Already on account of the improved conditions in the steel trade, there is talk of increased prices. Responsible authorities, however, believe that an increase at present would not be justified and might disturb seriously the confidence which is returning in the market. Orders for steel from agricultural sources are slow. Most of the business on old contracts has been taken out, and practically no new contracts have been made yet.

We quote, Chicago delivery, as follows:

Bar iron, 1.30c to 1.35c; hard steel bars, re-rolled, 1.35c to 1.40c; soft steel bars and bands and small shapes, 1.58c to 1.63c, base; hoops, 1.73c to 1.83c; planished or smooth finished tire steel, 1.78c to 1.83c, base; iron finished tire steel, 1.73c, base; smooth finished machinery steel, 1 inch and larger, 1.98c; spring steel, 2.28c; crucible spring steel, 2.78c; tool steel, 7c to 9c, with higher prices for special grades. Quotations on shafting are 57 per cent off the list for carload lots, and 52 per cent off for less than carload lots, carload freight allowed to points in base territory.

On iron and steel from local stock, we quote as follows:

Bar iron, 1.80c to 1.90c, per pound base; soft steel bars, 1.80c to 1.90c per pound base; soft steel hoops, 2.10c to 2.20c, full extras.

Structural Material.—Activity continues to characterize the structural market in the west, the total amount of contracts let last week being 21,280 tons. The most important contract during the week was taken by the American Bridge Co. from the Minnesota Steel Co. for its new plant at Duluth, amounting to 13,000 tons. Work on this will be hastened and it is hoped to have the buildings erected by the end of this summer. Additional bridge contracts amounting to 1,500 tons have been let by the Chicago & Northwestern Railway to the King Bridge Co., Cleveland. More contracts are being let for Chicago buildings, the latest being 2,250 tons for the Heyworth building, opposite the City Hall, taken by Brown-Ketcham Iron Works, Indianapolis, and the City Club, 200 tons, let to Vierling Steel Works. The Milwaukee Bridge Co., Milwaukee, has taken a contract for a highway bridge, 1,000 tons, at Peoria, Ill. A high school building at Portland, Ore., 1,100 tons, has been let to Milliken Bros., and the Pabst Brewing Co., Milwaukee, has let 2,000 tons for a new building to the Worden-Allen Co. The Virginia Bridge Co., Memphis, Tenn., will fabricate a swing bridge, 230 tons, to be erected at Dallas, Tex.

Business in plain material is improving and heavy specifications, amounting to about 12,000 tons, have been received by the leading interest. An encouraging feature of the structural market is that fabricating prices are improving, quotations on recent work being about $3 higher. on an average, than 10 days ago.

We quote, mill prices for structural shapes, f. o. b. Chicago, as follows:

Beams and channels, 15 inches and under, 1.58c to 1.63c. For extras, see Pittsburg report.

Store prices, f. o. b. Chicago, are as follows:

All angles, 3 inches and larger, including 6 inches, $1.80 to $1.90 per 100 pounds; angles over 6 inches, $1.90 to $2 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $1.80 per 100 pounds, base; channels, 3 inches and larger, $1.80 per 100 pounds, base.

Rails and Track Supplies. — Rail orders entered on the books of the Illinois Steel Co. last week amounted to 100,000 tons, of which the majority is this company's allotment of the New York Central order. Included in the above, however, are 35,000 tons of standard rails ordered by various western trunk lines. Business in track supplies is better. No large new contracts have been received but specifications and miscellaneous orders have improved perceptibly.

See Pittsburg report for prices on standard sections.

We quote, light rails and track supplies f. o. b. Chicago, as follows:

Light rails, carloads, 40 to 45-pound, 1.16c to 1.20½c; 30 to 35-pound, 1.19½c to 1.24c; 16, 20 and 25-pound, 1.20½c to 1.25c; 12-pound, 1.25c to 1.29½c.

Light section relayers, 45 pounds and under, subject to inspection, $21 to $23; standard section relaying rails, subject to inspection, $23.50 to $24.

Track supplies, f. o. b. Joliet, angle bars,

1.50c to 1.60c; railroad spikes, 1.65c to 1.75c; smaller size spikes, 1.70c, base; track bolts with square nuts, 2.15c to 2.25c, base.

Plates.—Plate orders have improved very much and over 12,000 tons were taken by local mills in this market last week. Included in the car business which has been recently placed are 1,000 refrigerator cars for the American Refrigerator Transit Co., and 500 refrigerator cars for the Chicago, Burlington & Quincy Railroad.

We quote, Chicago delivery, as follows:

Tank plates, ¼ inch thick, 6¼ to 100 inches wide, 1.58c to 1.63c. For extras, see Pittsburg report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, 1.80c to 1.90c; from 72 inches to 96 inches wide, 1.90c to 2c; 3-16 inch up to and including 60 inches wide, 1.90c to 2c; 72 inches, 2.15c to 2.25c; No. 8, up to 60 inches wide, 1.95c to 2.05c. Flange quality and heads, 25c extra.

Sheets.—The local sheet mill is now running about 55 per cent capacity and inquiry has improved slightly. The store trade in sheets is still quiet.

We quote, store prices, f. o. b. Chicago, as follows:

Blue annealed No. 10, 2.10c to 2.20c; No. 12, 2.15c to 2.25c. Box annealed, No. 28, 2.75c to 2.85c. Galvanized, No. 28, 3.65c to 3.75c.

For mill prices, see Pittsburg report. Freight to Chicago, 18 cents.

Wire Products.—The wire trade is still the most active department in the steel business. The advanced prices have not checked the volume of new business which is being taken. Jobbers are sending in orders for their spring requirements for nails and fencing and the total amount of business booked is very satisfactory.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.93; retailers' carload lots, $1.98; retailers' less than carload lots, $2.08; painted barb wire, jobber's carload lots, $1.93; retailers' carload lots, $1.98; retailers', less than carload lots, $2.08; with 30c for galvanizing; plain wire to jobbers, $1.73; plain wire, retailers' carload lots, $1.78; staples, bright, $1.93.

Merchant Pipe and Tubes.—The demand for the generally used sizes of merchant pipe is improving to some extent and leading jobbers are reporting very comfortable business at present. Demand for boiler tubes is also somewhat better. Local discounts on iron and steel pipe out of store have been revised slightly, minimum prices being generally one point lower than previous quotations.

We quote, iron and steel pipe and tubes out of store, f. o. b. Chicago, as follows:

IRON AND STEEL PIPE BASING PRICE.

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
⅛-¾ inch	69.2	54.2	63.2	48.2
¼ inch	72.2	59.2	66.2	53.2
2 in. to 3 in.	77.2	66.2	72.2	61.2
4½-6 inches	74.2	63.2	69.2	58.2
7-12 inches	71.2	54.2	67.2	50.2
EXTRA STRONG PLAIN ENDS.				
½ inch	70.2	63.2	64.2	52.2
2-3 inches	75.2	68.2	61.2	55.2
7-8 inches	65.2	....	59.2	47.2
DOUBLE EXTRA STRONG.				
½ inch	58.2	50.2	....	....
2-3 inches	63.2	55.2	....	....
7-8 inches	53.2	41.2	....	....

Tubes.

	Lap weld steel. Per cent.	Charcoal iron. Per cent.	Shelby seamless. Per cent.
1 inch	38	..	57½
1¼ to 2¼ inch	52	38	35
2¼ to 5 inch	62	50	46

Cast Iron Pipe.—Good specifications are being received from gas companies. The leading interest has received a contract for 2,000 tons of water pipe from Kansas City, Mo., and the American Cast Iron Pipe Co. has taken 950 tons from the city of St. Paul, Minn. Chicago opened bids February 1, on 2,300 tons of 36-inch and 1,000 tons of 30-inch water pipe. Prices are unchanged.

We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $25; 6 to 12 inches, $24.50, larger sizes, $23.75; gas pipe, $1 a ton higher.

Old Material.—There is no change in the local scrap market. Recent railroad offerings, which have been moderate, were disposed of without difficulty. The market is still weak and prices show no change for the better. Re-rolling rails, 5 feet and over, are especially soft and have been shaded 25 cents a ton. There is not as much scrap in the hands of dealers and other sellers in the immediate Chicago district as was the case a year ago, but dealers in the smaller cities, and throughout the country districts are carrying much heavier stocks than has been the case for many months. It is these supplies, coupled with large holdings by railroads, that prevent any stiffening in prices.

We quote the market, f. o. b. Chicago, as follows:

GROSS TONS.	
Old car wheels	$12.00 to 13.00
Old iron rails	14.25 to 14.75
Rerolling rails (5 ft. and over)	13.25 to 13.75
Old steel rails (3 ft. and under)	12.50 to 13.00
Frogs, switches and guards	11.75 to 12.25
Heavy melting steel	11.50 to 12.00
Shoveling steel	11.25 to 11.75
NET TONS.	
No. 1 R. R. wrought	$11.50 to 12.00
No. 2 R. R. wrought	10.50 to 11.00
Arch bars and transoms	14.00 to 14.50
Knuckles, couplers and springs	11.50 to 11.75
Shafting	15.75 to 16.25
Iron car axles	18.25 to 18.75
Steel car axles	17.50 to 18.00
Locomotive tires	16.00 to 16.50
Dealers' forge	10.50 to 11.00
Pipes and flues	8.50 to 9.00
No. 1 cast, 150 lbs. and less	11.75 to 12.25
No. 1 busheling	9.25 to 9.75
No. 2 busheling	7.50 to 8.00
No. 1 boiler cut	8.75 to 9.25
Boiler punchings	14.25 to 14.75
Cast and mixed borings	5.00 to 5.50
Machine shop turnings	6.50 to 7.00
Railroad malleable	10.75 to 11.25
Agricultural malleable	10.25 to 10.75
Stove plate and light cast scrap	10.25 to 10.75
Angle bars, splices, etc., iron	13.00 to 13.50
Angle bars, steel	11.00 to 11.50

CLEVELAND

Flurry Among Sheet Makers—Pig Iron Continues Dull.

Office of THE IRON TRADE REVIEW,
Penton Building, Jan. 31.

Iron Ore.—A suggestion made last week that sentiment be aroused in favor of greater stability in ore prices is being favorably received and will probably take more definite form at a not far distant date.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $5; Mesabi Bessemer, $4.75; old range non-Bessemer, $4.20; Mesabi non-Bessemer, $4.

Pig Iron.—The market in the immediate Cleveland district continues extremely dull, and it is understood that a few sales of small tonnages have been made below prevailing quotations. On the other hand, some sellers are holding firmly to $14 at the furnace as the minimum for pig iron for delivery in Cleveland. We quote, delivered in Cleveland, for the first half of this year, as follows:

No. 1 foundry	$14.75
No. 2 foundry	14.25
No. 2 Southern	15.35
Gray forge	14.00
Bessemer	15.90
Lake Superior charcoal	17.50
Jackson Co. 8 per cent silvery	19.00

Coke.—The market is very quiet, while some founders are buying fair amounts for current demands.

Connellsville furnace coke, $1.40 to $1.45 for prompt delivery, and $1.60 for first half. Connellsville foundry coke, $1.95 to $2 for prompt, and $2 to $2.50 for first half.

Finished Material.—Improvement in finished material has been well maintained during the past week, and both mill agents and jobbers are well satisfied with the showing made by January. Additional contracts have been made, including a number for steel bars. Some commotion was caused among sheet manufacturers by a Youngstown concern taking about 5,000 tons of sheets at a low price, but investigation developed that the sales were made before the recent meeting, at which it was decided to maintain prices. The action of the sheet manufacturers in deciding not to pay commissions to jobbers is not taken very seriously. Since the recent

advance in wire, sales have been very limited, but there has been more specifying on old contracts. The steel for the new ore boat to be built by the American Ship Building Co for the Wisconsin Steel Co., 3,000 tons of shapes and plates, will probably go to an independent interest. The Central Y. M. C. A. building in Cleveland will require about 2,000 tons of steel. The new hotel Jerome, to be erected at Erie, Pa., will cost $450,000 and will probably require 2,000 tons of steel.

Old Material.—Little change has taken place in the movement of material locally, although some mills, both inside and outside of the city, show more of a disposition to accept shipments. Some dealers, while not aggressive, appear to feel that heavy steel will advance shortly and seem more disposed to hold onto their stock. We continue to quote, gross tons, f. o. b. Cleveland, as follows:

Old iron rails	$15.00 to 15.50
Old steel rails (under 6 ft.)	13.50 to 14.00
Old car wheels	12.00 to 12.50
Old steel boiler plate	10.00 to 10.50
Malleable iron (railroad)	12.75 to 13.25
Steel axles	18.00 to 18.50
Malleable iron (agricultural)	11.00 to 11.50
Heavy steel	12.75 to 13.00
Country mixed steel	10.00 to 10.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$12.00 to 12.50
No. 1 busheling	10.50 to 11.00
No. 1 machine cast	11.75 to 12.25
Axle turnings	8.50 to 9.00
Machine shop turnings	6.25 to 6.75
Grate bars	10.00 to 10.50
Pipes and flues	8.50 to 9.00
Tank iron	8.00 to 8.50
Sheet iron	4.00 to 4.50
Wrought drillings	6.00 to 6.50
Cast borings	5.50 to 6.00
Stove plate	10.00 to 10.50

CINCINNATI

Furnaces Refuse to Quote Further Than First Half.

Office of THE IRON TRADE REVIEW,
808 Provident Bank Bldg., Jan. 31.

Pig Iron.—While activity and sales in both the eastern and western territories indicate some improvement, locally there can be said to be practically no change from last week, either in quotations, sales or inquiries. Apparently the situation hinges on the action that will be ultimately taken by the government in the railroad cases now under discussion. While there have been some inquiries for quotations for second half, furnace interests generally refuse to consider quoting at all for further than first half. Stocks in furnace yards are still being decreased, and at the present time the demand probably just about equals production. Many small orders for 300 to 500 tons are the limit of general activity. Some buyers are buying lots of iron that suit them, but the majority of buyers are holding off, not caring to tie up more capital than necessary in stocks as long as there appears to be no immediate prospect of any increase in prices. Selling interests are maintaining generally, $11, Birmingham and $14, Ironton, and $14 to $14.25, Ironton, for malleable, as base quotations. On the other hand $10.75, Birmingham, for a spot sale could probably be made without great difficulty. Ohio steel makers have shown considerable activity the past week, and several sales of fair tonnage were closed. A 1,000-ton inquiry from Illinois territory for basic and some inquiry from southern Ohio for small lots of basic, are items of activity in this territory. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f. o. b., Cincinnati, for prompt shipment as follows:

Southern foundry No. 2	14.25	14.75
Southern foundry No. 3	13.75	14.25
Southern foundry No. 4	13.25	13.50
Southern gray forge	13.00	13.25
Mottled	12.75	13.00
Southern No. 1 soft	14.75	15.25
Southern No. 2 soft	14.25	14.75
Standard Southern car wheel	25.25	25.75
Northern No. 2 foundry	15.20	15.45
Northern No. 3 foundry	14.70	14.95
Northern No. 4 foundry	14.20	14.45
Jackson county, 4 per cent silicon	16.20	16.70
Jackson county, 5 per cent silicon	16.70	17.20
Jackson county, 6 per cent silicon	17.20	17.70
Jackson county, 7 per cent silicon	17.70	18.20
Jackson county, 8 per cent silicon	18.20	18.70
Jackson county, 9 per cent silicon	18.70	19.20
Jackson county, 10 per cent silicon	19.20	19.70
Jackson county, 11 per cent silicon	20.20	20.70
Jackson county, 12 per cent silicon	21.20	21.70

Coke.—For Wise county and Pocahontas furnace coke $1.75 for prompt shipment is a minimum figure, while $2.00 to $2.10 and $2.10 to $2.20 are quoted for future contracts to July 1. Ovens closed down are given little encouragement to light up. With the specifications against contracts representing the only activity, movement is nominal and the market dead. The following quotations are for prompt shipment and for the first half:

Connellsville district:	Prompt Shipment.	Contract to July 1.
Foundry coke	$2.00 to 2.50	$2.15 to 2.50
Furnace coke	1.50 to 1.60	1.65 to 1.75
Wise county district:		
Foundry coke	2.00 to 2.10	2.00 to 2.10
Furnace coke	1.75	*Sliding [scale basis.
Pocahontas district:		
Foundry coke	2.00 to 2.10	2.10 to 2.25
Furnace coke	1.75	1.75 to 1.85
New river:		
Foundry coke	2.50 to 3.25	2.60 to 3.25
Furnace coke	2.00 to 2.15	2.10 to 2.20

*Sliding scale basis means $1.60 for coke based on $9, Birmingham, for pig iron, with an advance of 16 2-3 per cent of the amount over $9 at which pig iron is quoted. This is the usual basis. Other forms of sliding contracts are also made.

Finished Material.—Spikes have been an active item in finished products recently. Shafting has been featureless, while angles of all sizes are moving freely. Several small manufacturing plants are being projected that will call for a fair tonnage. Activity continues with prices firm and unchanged at $1.40 Pittsburg base.

Old Material.—Dealers are buying and storing material for the most part, the only sales being routine and stocks are constantly increasing. Only first class material is in demand at all by local consumers. No. 1 cast scrap can be had for about $11 per ton. Prices quoted for material f. o. b., dealers' yards, Cincinnati, are about as follows:

GROSS TONS.

Old iron rails, gross	$14.50 to 15.00
Old steel rerolling, gross	14.00 to 14.50
Old short lengths, gross	13.00 to 13.50
Old iron axles, gross	17.00 to 17.50
Steel melting scrap, gross	11.00 to 11.75
Car wheels, gross	11.50 to 12.00

NET TONS.

Old No. 1 R. R. wrought, net tons	$10.50 to 11.00
No. 1 machinery, net	10.50 to 11.00
No. 1 busheling, net	10.00 to 10.50
Stove plate, net	8.00 to 8.50
Heavy turnings, net	6.50 to 7.00
Cast borings, net	4.50 to 5.00
Grate bars, net	8.50 to 9.00
Sheet scrap, net	8.50 to 9.00
No. 1 cast scrap	10.50 to 12.00

ST. LOUIS

Last Vestige of January Activity Seems to Have Disappeared.

Jan. 30.

Pig Iron.—Indications of the beginning of a buying movement in pig iron, that made their appearance in the St. Louis territory about the middle of January, have about disappeared and the market has slackened to inquiries and orders for small lots for immediate shipment. Probably not more than a total of 1,000 tons, mostly for southern iron and all in small lots, is now in the market, although some belief is voiced in the report that one of the large steel plants is asking for prices on something like 7,500 tons of basic. If this is really a bona fide inquiry, and results in a purchase, it is believed locally that the sale will be made in Chicago. Prices for southern No. 2 remain firm at $11 to $11.50, Birmingham basis. Northern iron is quoted at $14 to $14.50, Ironton, with very little inquiry. Quotations on southern iron, delivered St. Louis, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$15.25 to 15.75
Southern No. 2	14.75 to 15.25
Southern No. 3	14.25 to 14.75
Southern No. 4	13.75 to 14.25

Coke.—Inquiries are out for upward of 50 cars of foundry coke, and sales of from 10 to 15 cars are reported to have been made within the last

few days. With this exception, the coke industry is about as dull as pig iron. Quotations remain nominally as follows:

We quote 72-hour Connellsville foundry grades, $2.35 to $2.50 for whole of 1911: 72-hour foundry, $2 to $2.25, on tracks and for immediate delivery; 48-hour Connellsville furnace, $1.60 to $1.85; best 72-hour Virginia foundry, $2 to $2.35; 48-hour Virginia furnace, $1.60 to $1.85. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Old Material.—The market for scrap continues dull, with prices remaining nominally as follows:

Old car wheels	$13.50 to 14.00
Old iron rails	14.50 to 15.00
Rerolling rails (4 ft. and over)	13.00 to 13.50
Old steel rails (2 ft. and under)	12.00 to 12.50
Light section relayers, 45 lbs. and under, subject to inspection	21.00 to 23.00
Relaying rails, subject to inspection	24.50 to 25.00
Frogs, switches and guards	12.00 to 12.50
Heavy melting steel	12.00 to 12.50
Shoveling steel	12.00 to 12.50

We quote, net tons, as follows:

No. 1 R. R. wrought	$11.50 to 12.00
No. 2 R. R. wrought	10.50 to 11.00
Arch bars and transoms	14.00 to 14.50
Knuckles, couplers and springs	12.00 to 12.50
Shafting	15.00 to 15.50
Iron car axles	18.50 to 19.50
Steel car axles	18.50 to 19.50
Locomotive tires	14.50 to 15.00
No. 1 country wrought	9.50 to 10.00
Pipes and flues	9.00 to 9.50
No. 1 cast, 510 lbs. and less	12.00 to 12.50
No. 1 busheling	10.25 to 10.75
No. 2 busheling	7.00 to 7.50
No. 1 boiler cut	9.00 to 9.50
Boiler punchings	10.25 to 10.75
Cast and mixed borings	5.00 to 5.50
Machine shop turnings	7.00 to 7.50
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.00 to 9.50
Stove plate and light cast scrap	9.50 to 10.00
Angle splice bars, iron	13.25 to 13.75
Angle splice bars, steel	12.00 to 12.50

Considerable Activity in Buying Foundry, Malleable and Basic Iron.

Jan. 31.

Pig Iron.—Quite a large tonnage of foundry iron was booked in this territory during the past week, the orders ranging from small amounts up to 1,000 tons. This increase in activity is credited to the recent drop in prices, which has produced a market very favorable to the buyer and a state of affairs that is not likely to continue long, as the furnaces claim to be operating at a loss. A large percentage of the tonnage booked was for early shipment. Inquiry continues good, and there is a good-sized volume of business under negotiation scattered over a large territory. Business in malleable and basic has also been good, and a large tonnage has been booked. The call for shipments of iron by foundries shows some improvement. The situation is looked upon by iron men as more encouraging. A report that a pipe interest that has been in the market for large tonnage has covered for at least a part of its needs could not be confirmed. Prices are unchanged. We quote, f. o. b. furnace, as follows:

No. 1X	$14.50 to 15.00
No. 2X	14.00 to 14.50
No. 2 plain	14.00 to 14.25
No. 3	13.75 to 14.00
Gray forge	13.75 to 14.00
Malleable	14.00 to 14.50
Basic	14.50 to 15.00
Charcoal	17.25 to 17.75

Finished Product.—No structural lettings are reported and the few jobs that are being figured are all small. In general lines specifications are reported to be coming in nicely, the activity in bar material, plates, shapes and other lines having increased. A decided movement in tin plate is reported due to the recent advances in pig tin, which are expected to lead to an advance in tin plate.

Old Material.—Some small sales are reported but on the whole the scrap market shows no improvement. We quote, gross tons, f. o. b. Buffalo, as follows:

Heavy melting steel	$12.25 to 12.50
No. 1 railroad wrought scrap	14.50 to 15.00
No. 1 railroad and machine cast scrap	13.50 to 14.00
Old steel axles	17.00 to 18.00
Iron axles	23.00 to 24.00
Car wheels	13.75 to 14.25
Railroad malleable scrap	13.75 to 14.00
Machine shop turnings	6.75 to 7.00
Cast iron borings	5.00 to 5.50
Low phosphorus steel scrap	17.00 to 17.50
Old iron rails	15.50 to 16.00
Tank iron	10.75 to 11.00
Sheet iron	6.50 to 7.00
Pipes and flues	10.25 to 10.75
Stove plate	12.00 to 12.50
Grate bars	11.50 to 12.00
Boiler plate	11.00 to 11.50

Pig Iron Sales in January Compare Favorably with Last Year.

Jan. 30.

Pig Iron.—Sales of iron during the month of January in this territory have approximated 75,000 to 100,000 tons and with some companies the record of transactions closed has exceeded the corresponding month of a year ago, when a very satisfactory volume of business was booked. Steel making irons have made up about 35,000 tons of this total, including about 25,000 tons of basic, while the cast iron pipe companies have been liberal buyers, taking 25,000 tons or more, and the remainder has been in scattered orders. At present, the makers are less willing to offer forward deliveries on metal at ruling prices, while consumers seem equally more desirous of obtaining prolonged shipments, with the result that negotiations are more numerous and there is more tone to the market. There is apparently a more determined effort being made to cut down the output in the east. The last of the active Wharton stacks has been blown out and one of the Warwick furnaces will go out in February. These two furnaces, which have been running on basic, alone have a capacity of 800 tons daily. The blowing out of other furnaces in the Lehigh and Schuylkill valleys is under consideration. The furnace of the Delaware River Steel Co., at Chester, Pa., is about to be put in to work up accumulated business. While as reported, basic iron in the east has sold considerably below $14.50 delivered in some cases, which has been approximately at $14.25 delivered, the last sale to be noted, that of 4,000 tons for prompt shipment just made, was done at $14.50 delivered. This price fairly represents the eastern market at present, while for second quarter a higher figure is asked. An eastern steel company has closed for a block of from 3,000 to 5,000 tons of low phosphorus iron far first quarter from a nearby furnace around $21 delivered. Recent sales of Bessemer iron in the east have been made at $16.50 delivered or about $15.75 eastern furnace. Considerable iron continues to be taken by the pipe makers of this district, one additional purchase of 5,000 tons of northern grades the past week, being reported. While certain brands of northern iron of the lower silicons have been sold to these consumers as low as $14 delivered, the most recent blocks of the same brands just taken have commanded an advance of 25 cents. There is more life to foundry iron inquiry in small lots and prices on eastern Pennsylvania and Virginia grades are unchanged.

We quote for prompt and first quarter shipment as follows:

No. 1X foundry	$16.00 to 16.25
No. 2X foundry	15.50 to 15.75
No. 2 plain	15.00 to 15.50
Standard gray forge	14.25 to 14.50
Basic	14.50
No. 2X Virginia	15.65 to 15.80
No. 2 Southern	15.00 to 15.50
Standard low phosphorus	21.00 to 22.00

Finished Material.—There has been an encouraging increase in new business placed in finished lines during the past several weeks, and specifications have been more liberal, so that there is an improved tone to the general market. The more active state of trade has applied to all lines, but has been especially marked in rails, in which one eastern mill reports bookings during January of over 100,000 tons. While buyers are still moving slowly and are backward in filling specifications for forward deliveries, conditions appear sounder and more promising than for some time. In rails, eastern mills, in addition to their allotments

from the Pennsylvania and New York Central contracts, have booked other important business from eastern roads. Among the orders most recently entered is that for 15,000 tons of the Chesapeake & Ohio railroad, a portion of which went to middle western mills. The Boston & Maine tonnage, totaling 50,000, is being placed this week. The Seaboard Air Line and the Atlantic Coast Line requirements are still pending.

No awards have yet been announced on the 4,000 tons of steel for the building of the Department of Printing and Engraving at Washington; or for the tonnage inquired for by the Chesapeake & Ohio for car underframes. The contract for the 2,000 to 3,000 tons for the Vine Street pier, this city, upon which the McClintic-Marshall Construction Co. is the low bidder, has been held up by protests from the union labor organizations. Eastern shipyards are well filled with repair work, and are calling for a good tonnage of heavy plates. Prices on plates appear firmer in the east. Several sales of open-hearth and Bessemer billets have been made recently at $23, Pittsburg, or $25.40, Philadelphia. Bar iron continues to sell at low prices in the east, in some cases down to 1.30c, Philadelphia, or 1.23c, eastern mill. We quote, for Philadelphia delivery, as follows:

Structural shapes, 1.55c to 1.60c; steel plates, 1.55c; steel bars, 1.55c to 1.60c; refined bar iron, 1.30c to 1.35c; 4 x 4-inch open-hearth rolling billets, 25.50; forging billets, $27 to $27.50, eastern mill.

Old Material.—While there is no active buying by consumers, the scrap market has a slightly better tone, because holders of material are not pressing much of it for sale. Comparatively small lots may be readily bought at the quoted schedule, but price advances would probably come with any tonnage movement. Accordingly there is some anticipation of better prices when the mills shall have exhausted some of their present stocks and are more actively supporting the market. Old car wheels are easier, consumers offering only about $13, delivered. Heavy steel is just about holding its own, one sale of 1,000 tons at $13.25 being noted. Foundry scrap is easy. We quote, gross tons, delivered in eastern Pennsylvania consuming territory, as follows:

Old steel rails (re-rolling)	$15.00 to 15.50
Heavy melting steel	$12.75 to 13.25
Old car wheels	13.00 to 13.50
Old iron car axles	25.00 to 26.00
Old steel car axles	20.00 to 21.00
No. 1 railroad wrought	16.00 to 16.50
Wrought pipe	12.75 to 13.00
Cast borings	7.75 to 8.25
Wrought turnings	8.25 to 8.50
Heavy cast scrap	14.00 to 14.50
Railroad malleable	12.00 to 12.50
Stove plate	10.50 to 11.00

Southern Pig Iron Makers Declare Belief Bottom Has Been Reached.

Birmingham, Ala., Jan. 30.

Pig Iron.—The principal features of the market during the week just closed have been the large number of sales of from single car lots up to 500 tons. This confirms a number of the producers in the belief that bottom has surely been reached, and that they are likely to see at most any time now a turn for the better. So firm is the belief in this district, that practically only one or two interests will now take business for shipment further ahead than 90 days on an $11 schedule, but are asking 50 cents premium where deliveries are to run as far ahead as five or six months. Another argument against prices going lower is that the country as a whole seems to be consuming about as much iron as is now being produced, and it is certain that in this district stocks will not show any material gain for the month of January as compared with tonnages on hand Dec. 31. There has been quite a call the past week for iron of special analysis, and it has developed that high silicon iron is practically not available. Gray forge is likewise of short supply and now commands practically the same price as No. 4 foundry. A great many consumers are beginning to feel out the market here in the South, as they have about concluded that $11 is going to be the bottom. Agricultural implement makers and pipe makers continue to be the principal purchasers in this market. There were two speculative inquiries of consequence before the market last week, and one party made a firm offer of $10.75 for No. 2 foundry, but could not obtain the iron.

Cast Iron Pipe.—Makers of cast iron pipe in this district have had opportunity to close up their books and accounts for the past year. It is generally admitted that for some months prices have not been profitable. This has a tendency to make them feel like obtaining a little better figures for their product. At the same time no appreciable advance is expected or hoped for until the pig iron market shall have shown some improvement. Two contracts were closed with southern foundries last week, one for 1,200 tons and one for 2,000 tons. Several other municipal contracts are now pending. Prices remain about as follows per net ton f. o. b. cars this district:

Four to six inch, $19.00.

Eight to 12 inch average, $17.50.

The above figures are for water pipe only, as gas pipe of course takes $1 per ton higher differential.

Old Material.—There is nothing encouraging in the scrap iron market. Consumption is not what the seller would like to see it and accumulations are moving rather slowly. Dealers quote the following schedule per gross ton, f. o. b. cars this district:

Old iron rails	$13.50 to 14.00
Old steel axles	16.50 to 17.00
Old iron axles	17.00 to 17.50
No. 1 R. R. wrought	11.50 to 12.00
No. 2 R. R. wrought	10.50 to 11.00
Dealers' wrought	10.00 to 10.50
Old steel rails	11.00 to 11.50
No. 1 machinery	10.00 to 10.50
No. 1 steel	10.00 to 10.50
Old standard car wheels	12.50 to 13.00
Light castings, stove plate	8.50 to 9.00

Charter Market Change on Feb. 1 Stirs Local Situation.

Seattle Jan. 25.

Pig Iron.—In marked contrast to the more than normal movement of pig iron in this section last week is the small amount of business done during the past few days. The users appear to have gotten in their supplies at about the same time and left the market flat, although they are all running about on full time. A change in the charter market will take place on Feb. 1 and this has a brightening effect. The steamer lines will drop their freight rates to the summer basis and the jobbers in the foreign brands of iron are already beginning to order for delivery in the second quarter. There is little foreign iron on the market at present owing to the high winter rates that are about to be dropped, and as a result those mills that use this class of iron are being compelled to pay considerably higher than they have for some time. A large amount of southern iron is being offered in the section at $21.50 for No. 1 and a number of the foundries are using this brand. Its irregularity militates against it to some extent and a few of the foundries are still taking on the Glengarnock and Jarrow at much higher prices because of the standard which it seems to maintain. There is very little of this class of iron coming in, however, and it is very probable that the market will be entirely cleaned out of the foreign before the orders of this week arrive.

We quote spot, in gross tons foreign iron ore ex ship Puget Sound or Col-

umbia river domestic, f. o. b. Pacific coast terminal as follows:

	Prompt.	Second quarter.
No. 1 Glengarnock	$24.50	$24.50
No. 1 Eglinton	23.50	24.00
No. 1 English Jarrow	23.50	23.50
No. 1 Chinese Hanyang	23.50	23.00
No. 1 Cleveland	23.50	23.50
English Doncaster	23.00	23.00

Finished Material.—A continued entrance into the local markets for structural material instead of the consumers going to the eastern field for fabrication work is giving a most healthy tone to the conditions. Alaska orders are coming in heavier than usual and a majority of the work from the far north is being placed in this city or at Portland. The railroads are making inquiries for material to build a number of large steel bridges and there is every indication that the material will be supplied from this section. The demand for sheets, bars and wire products is very good and sellers are handling the big orders in good shape despite a slow railway delivery.

Old Material.—The large amounnt of offerings of the past month in this market still obtain, and dealers are not taking on any more material than they can readily dispose of. Their yards are still full and they do not care to store any more. Practically all the mills have a good supply on hand, although they are buying rather freely in order to take advantage of present low prices. The lists of the transcontinental roads are still pending. We quote, in gross tons, as follows:

Foundry scrap No. 1	$17.00 to 18.00
Foundry scrap No. 2	12.00 to 14.00
Old car wheels	15.00 to 16.00
Railroad wrought	10.00 to 12.00
Miscellaneous steel scrap	6.00 to 9.00
Grate bars	4.50 to 6.00
Stove plate	9.00 to 10.00

NEW YORK

Sales of Wabana Ore—Pig Iron More Active—Finished Lines Improve.

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., Jan. 31.

Iron Ore.—Sales of about 100,000 tons of Wabana, Newfoundland, ore have been made to eastern blast furnaces on the basis of 7⅜ cents per unit, f. o. b. cars at Philadelphia. This price represents an average advance of from ⅛ to ¼ cent per unit over last year, when this ore, at different periods in the year, sold at from 7 to 7½ cents per unit at Philadelphia. About 100,000 tons additional of Wabana ore is being offered for this year's delivery which, with the shipments carried over into this year from 1910 contracts, will bring the movement of this ore up to the customary annual total of about 275,000 tons. Reports from the trans-Atlantic ore market show a very firm condition of prices and in the cases of some of the best ores as much as 50 cents per ton advance over last year has been paid by European iron makers. Because of the better market in England, Germany and other large consuming countries of this ore, no great effort is being made to sell the rich Swedish ores to eastern furnaces at this time.

Pig Iron.—The broadened tonnage of bookings in pig iron which have characterized the market for the past several weeks is being sustained and the situation has more marks of promise. The new inquiry is holding up well and in a number of instances consumers appear willing to cover upon their needs at approximately today's prices as far ahead as the furnaces will accept. The disposition of sellers, however, is to limit orders as much as possible to early delivery periods. Prices, as a consequence, are easier for prompt than for second or third quarters. In Buffalo some makers continue to sell early delivery iron at $13.50, furnace, for No. 2X, or $15.95, New England. In eastern Pennsylvania down to $14.75, furnace, for No. 2X, according to delivery point, could probably be done on standard grades for nearby shipment, but on forward iron the minimum of $15, furnace, is generally asked.

A Buffalo pipe interest has closed upon its inquiry for 5,000 tons of lower grades and another large pipe buyer, who has been in the market for a round tonnage, has temporarily withdrawn most of this business, pending a company reorganization, and is now actively negotiating for only about 1,500 tons. A New Jersey consumer took 500 tons for forward shipment from eastern Pennsylvania furnaces. Several of the largest New England buyers have been sounding the market for first quarter and first half, one with an inquiry for 4,000 tons, another for 4,000 to 5,000 tons, while a third is tentatively interested. New England territory is showing a very fair amount of activity at present, but some low prices are still to be heard there and buyers are backward to close on large lots. After having closed for about 35,000 tons of basic during the past several weeks, according to the latest reports, eastern steel makers would probably take on considerable additional tonnage if they could duplicate former prices. This grade seems to be firmer, however, at a $14.50, delivered, minimum. The Washington navy yard is inquiring for 500 tons of low phosphorus iron. The Robesonia furnace is expected to blow out in February. We quote for prompt and first quarter shipment at tidewater as follows:

Northern foundry No. 1	$15.75 to 16.00
No. 2X foundry	15.25 to 15.75
No. 2 plain	14.75 to 15.25
No. 2 Virginia	15.30 to 15.80
No. 2 Southern foundry	15.25 to 15.75
Malleable	15.75 to 16.25
Gray forge	14.25 to 14.50

Ferro-Alloys.—Buying of ferro-manganese at present is confined to small lots and sales of the week have not exceeded 500 tons. Prices are unchanged but most of the going business is at the minimum of $38, seaboard. We quote, 80 per cent ferro-manganese, at from $38 to $38.25, seaboard, and 50 per cent ferro-silicon at $55, seaboard.

Finished Material.—On all sides the finished material market is showing a healthier and more promising tone. For several weeks past, sales offices in practically all lines have noted a broadening of buying activity and this is now being sustained in a way to stimulate hope that a permanent improvement has set in. The volume of railroad patronage is showing up considerably better, not only in rails but in bridges, track supplies and in frog and switch work.

Prices in finished lines are holding firmer than for a number of months and it is not improbable that special conditions may cause some advances in the near future. This is especially true in tin plate, where the rising market in pig tin has caused a number of the independent manufacturers to seriously entertain the advisability of an advance in the finished product. The present market on pig tin is about 10 cents a pound higher than it was six months ago.

Definite action on some large structural contracts was taken this week. The American Bridge Co. has received the award of 12,000 tons for the bridge over the Ohio river at Kenova, West Virginia, for the Norfolk & Western railroad, and has been ordered to proceed with the fabrication of 18,000 tons for the joint railroad bridge of the Kentucky & Indiana Bridge Co., at Louisville, Ky., which, though awarded a number of months ago, has been held up. The leading interest has also received orders to fabricate 10,000 tons for the completing portions of the new plant of the Minnesota Steel Co., at Duluth. The New York, New Haven & Hartford has placed 2,500 tons for overhead

bridges with S. W. Bowles & Co. The Lake Shore railroad is inquiring for 500 tons of bridge work; the New York Central for a 500-ton bridge at Niagara Falls, while the New York, New Haven & Hartford and the Boston & Maine continue to put out a number of small bridges. The Heyworth building, Chicago, 2,200 tons, has gone to the Brown-Ketcham Iron Works; the Lincoln high school, Portland, Ore., 1,000 tons, to Milliken Bros., Inc.; a loft building on West Thirty-Sixth street, this city, 1,700 tons, to the Hay Foundry & Iron Works; and a building for the Central Union Gas Co., this city, 1,000 tons, to Port & McCord. Bids are going in this week for the Cruishank warehouse at Greenwich and Morton streets, this city, 5,000 tons, and 1,000 tons for the Fischell building, on Broadway, this city. Bethlehem sections are to be used in the large Insurance Exchange building, at Chicago, which, as reported last week, will be fabricated by the Brown-Ketcham Iron Works.

We quote, New York delivery, as follows: Angles, 3 to 6 inches x ¼ inch and heavier, 1.56c to 1.61c; beams, 3 to 15 inches, 1.56c to 1.61c; tees, 3 x ¼ inch and heavier, 1.56c to 1.61c; plates, carload, tank, 1.56c to 1.61c; boiler steel, 1.66c to 1.71c; marine boiler, 1.96c to 2.01c; bar iron, 1.34c to 1.37c; soft steel bars, 1.56c to 1.61c.

Rails and Track Material.—The mills have received informal notices of the allotments of the Boston & Maine and New York, New Haven & Hartford rail requirements, aggregating 50,000 tons, and the contracts will probably be closed this week. The Delaware, Lackawanna & Western railroad is expected to place an additional lot of 5,000 tons of rails this week. Eastern roads have been quite active in placing their rail needs but there remains considerable important business to be placed, including the Bangor & Aristook, Maine Central, Delaware, Lackawanna & Western and other lines, in addition to the tonnages of the Canadian Pacific and Grand Trunk systems, a part of which usually comes to eastern mills. Track fastenings are more active and there has been a market change for the better in frog and switch work, in which the market of late has been rather slow. Light rails are also in greater demand and the sale of one lot of 3,000 tons to a coal mining company is noted.

Old Material.—The hand to mouth nature of buying still prevails in old material. Dealers' yards in the eastern district are not heavily stocked, but there is considerable material accumulating in producers' hands which the holders are reluctant to release at ruling prices. As a consequence, the yards are not able to readily secure material, although the demand is so moderate that this withholding of scrap is having little effect upon the market. Considerable of this material is expected to be released in the spring and it is not improbable that as a result lower prices will prevail before any advance sets in. We quote, gross tons, prices New York dealers will pay at tidewater, with the exception of cast scrap, which has a local demand, as follows:

Old car wheels	$12.00 to 12.50
Old iron axles	22.50 to 23.00
Old steel shafting	16.00 to 16.50
Heavy melting steel	10.50 to 10.75
No. 1 R. R. wrought	13.00 to 13.50
Iron track scrap	11.50 to 12.00
Wrought pipe	10.00 to 10.50
Cast borings	6.00 to 6.50
Wrought turnings	6.00 to 6.50
Heavy cast scrap	12.00 to 12.50
Railroad, malleable	12.00 to 12.50
Stove plate	9.00 to 9.50
Grate bars	9.00 to 9.50

British Iron Market.

Pig Iron Demand Drops, But Other Lines Show Activity

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Jan. 21.

There is not quite the same pressure for pig iron as was experienced a week ago, but this may be merely the result of recent extensive buying. At the Cleveland market yesterday, there was a distinct lull with slightly easier prices. Cash dealings yesterday were on the basis of 49s 7d ($12.14) for No. 3 warrants, which is 6d below the best price of the month, and the lowest figure for more than a month past. The large stocks in store, 541,318 tons in Middlesbrough, enable buyers to take immediate advantage of the least lull or unfavorable circumstance, and this is an element which may shortly be considered. It is notable that every other market shows undiminished strength, and even in Middlesboro the tone is fairly confident. An additional 6d is asked for March delivery, and for iron from the furnaces No. 3 is able to secure 49s 10½d ($12.21) although small quantities of second-hands can be got for 49s 9d ($12.18). Generally, pig iron deliveries tend to increase in volume, but here and there there are complaints of want of specifications, which show that there has been considerable speculative buying. Coke continues very firm, and rubio ore is at 22s 6d, which is relatively a high price. The Cleveland rate for hematite is 65s 6d ($16.4), but 66s ($16.16) has been obtained, and is likely to become general. In the Welsh district, hematite has been advanced 1s 6d this week, and the market is strengthening rapidly.

Finished Material.—The Midland iron trade is showing a more healthy tone, with improving prices. This applies especially to unmarked bars, and some sales were effected on Thursday at £6 7s 6d, which is 5s better than the recent basis. Galvanized sheets have not quite recovered from the recent lull. The black sheet trade is very active, and some difficulty is found in getting adequate supplies. In spite of the great activity in the steel trade, prices continue unchanged, solely, as it seems, owing to respect for foreign competition. That this is fairly well founded is shown by the placing of an order for 20,000 tons of American billets by a Welsh tin plate firm, while continental reports are none too confident. Nevertheless, the price of billets tends upward, and the largest houses talk about a coming advance of half a crown a ton. The tin plate trade continues to experience boom conditions, and prices are rising rapidly. This week a rise of £5 10s in block tin has necessitated another revision of tin plate prices, so that Bessemer standard cokes are now quoted at 14s 9d, and oil sizes at 15s 3d to 15s 6d per box. All the mills are working at high pressure.

METAL MARKETS

New York.

Jan. 31.

Tin.—Aggressive manipulation by the syndicate in the local, as well as the London market during the week, advanced the prices of both spot and future tin, to the highest figures recorded since May, 1906. Spot sold at 44.50c, in the domestic market, and at £203 15s in London yesterday. This is an advance of 2,75c, and £12 10s for the quotations in the respective markets, since Jan. 23. Domestic consumers have bought rather more freely during the week, although most of the buying was done in the first three or four days, when the market was between 42c and 43c. The leading consumer in this country was a prominent purchaser until the price crossed 43c, but in common with other domestic users, has apparently been out of the market since then. The monthly tin statistics, appearing today, made a less favorable showing from the [illegible]ers' viewpoint, than had been [illegible]icipated. Deliveries into American consumption were only 3,200 tons, and tin in warehouses and at landings rose from 854 tons to 1,707 tons during the month. The arrivals since Jan. 1 aggregate 4,053 tons, excluding 400 tons due on the Mesaba today. The total

shipments from the straits are 4,290 tons during January, 1911, compared with 5,895 tons in the same month last year. A sharp decline set in when the figures were published, and at the close tin was offered at 43.25c in the local market, and both spot and future contracts at £197, in London.

Copper.—Indifference on the part of copper consumers continues the distinctive feature of the market, except where bargain prices are quoted. The result has been even lower prices than were recorded during last summer, when the domestic surplus was approximately 50,000,000 pounds larger than it is at present. Electrolytic sold at 12.20c, cash, New York, yesterday, and though somewhat better prices are asked today, there is very little demand and business could probably be done at 12.25c, cash, and 12.37½c, delivered, 30 days. The leading producers continue to quote 12.50c, delivered, for electrolytic. Lake is very quiet at 12.62½c to 12.75c.

The exports since Jan. 1 are 29,257 tons.

Lead.—A light demand for pig lead is noted among the independent sellers, and it is probable the prevailing quotation of 4.50c could be shaded. The American Smelting & Refining Co. continues to ask 4.50c for shipments.

Spelter.—The price of spelter has declined to 5.45c, in New York, and some increase in inquiry is noted around the low level.

Antimony.—A slightly easier tone is shown in special brands of antimony. Cookson's is 8.25; Hallett's is 7.75c, and Hungarian is 7.12½c.

Chicago.

Chicago, Jan. 31.

New Metals.—Trading in copper during the week improved and any further decline in prices has been checked. Spelter at the close of the week was 10 cents lower than on Monday and purchasing has been stimulated to a moderate extent by the lower quotations. Tin showed considerable strength during the week. The increase in price in the local market was not due to a demand for this metal on the part of consumers, but was merely on account of higher prices in the east and abroad.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 12⅞c; casting, 12¾c; smaller lots, ¼c to ⅜c higher. Spelter, car lots, 5.30c to 5.35c; lead, desilverized, 4.45c, in 50-ton lots; corroding, 25c per 100 pounds higher; sheet zinc, $7.50 list, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 43½c; Cookson's antimony, 10c; other grades, 9c to 10c.

Old Metals.—Some fair business in old copper was done during the week and to a limited extent purchasers are showing more interest in their future requirements. Price changes have been only fractional and stocks of material in the hands of dealers and other selling interests are large.

We quote, dealers' selling prices, f. o. b. Chicago, as follows:

Copper wire, 12½c; heavy copper, 12¼c; light copper, 11¼c; heavy red brass, 11c; heavy yellow brass, 9c; light brass, 7c; No. 1 red brass borings, 9¼c; No. 1 yellow brass borings, 6¾c; brass clippings, 8½c; tea lead, 3.80c; lead scrap, 4¼c; zinc, 4.60c; tin pipe 38c; tin foil, 32c; pewter, 28c; electrotype plates, free from wood, 4c; electrotype dross, 3c; stereotype plates, 4½c; stereotype dross, 3¼c; linotype dross, 3¼c; prime slab zinc dross, $75 per ton.

St. Louis.

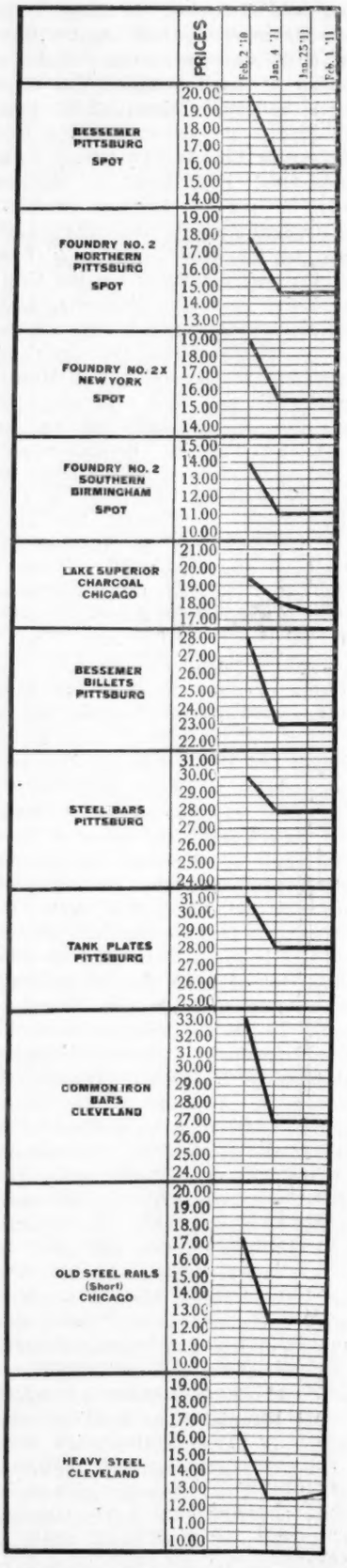
Jan. 30.

Lead and Zinc.—A top price of $45 a ton was realized in the open market for zinc blende in the Missouri-Kansas-Oklahoma district last week, figured on a basis of $42.50 for 60 per cent grades. The average price paid, however, was $42 a ton, with only a few choice lots bringing the high figure. Second grade ore sold for $40.23, contract base, equal to about $41.23, base, in the open market. The base price in the open market ranged from $36 to $39 a ton. The contract base price last week was figured on the average spelter market at East St. Louis for the previous week, which was 5.38c. The average price for spelter last week was 5.28½c. Calamine sold on a basis of $24 for 40 per cent grades, ranging down to $21 a ton. The top price paid for choice lots was $27.

Lead ore was stronger than for the previous week, selling as high as $58 a ton, compared to $57.50 for the previous week. The bulk of the ore sold for $56 and $57. Pig lead at St. Louis was unchanged at the close of the week at 4.35c.

The Milwaukee organization of employers, of which Theodore O. Vilter was recently chosen president, is the Milwaukee Metal Trades & Founders' Association, not the Milwaukee branch of the National Metal Trades Association, the latter having no branch in Milwaukee.

PRICE CHART



MARKED IMPROVEMENT

In Finished Bookings—Quarterly Statement of Steel Corporation.

A marked improvement in all finished lines was reported by Chairman E. H. Gary to the board of directors of the United States Steel Corporation at the regular quarterly meeting, Jan. 31. Judge Gary stated that the reports from the general managers of sales of the different subsidaries received weekly are all very favorable, more so than at any time in the past six months. The last report of daily bookings to be received before the meeting was that of Jan. 27 and including that day, the average daily tonnage booked throughout January was over 30,000, exclusive of the large orders for rails which have been received the past few days, but which have not yet been reported. The tin plate, wire and export business, Judge Gary reported as being very active.

At the meeting of the directors, the resignation of William Ellis Corey as president of the Corporation was accepted, and James A. Farrell, president of the United States Steel Exports Co., was formally chosen as his successor. Thomas Morrison, of Pittsburg, also tendered his resignation as a director, which was accepted, and Mr. Farrell was elected to fill the vacancy on the board.

The net earnings for the calendar year of 1910 were announced as $141,144,002, compared with $131,491,414. in 1909, and $91 847,710 in 1908. The regular quarterly dividends upon the common and preferred stock were declared.

The following statement of earnings for the quarter ended Dec. 31, 1910, was submitted:

EARNINGS.

October, 1910	$10,512,130
November, 1910	8,228,857
December, 1910	7,249,991
Total earnings	$25,990,978
Less charges	5,528,518
Net earnings	$20,462,460
Deduct interest, etc.	7,311,962
Balance	$13,150,498
Less net balance	83,766
	$13,066.732
Dividends	12,658,700
Surplus net income for quarter	$ 408,032
Bal. surplus for previous quarters.	16,520,687
Total	$16,928,719
Less appropriations and reserve	6,000,000
Balance of surplus for the year carried forward	$10,928,719

UNFILLED ORDERS ON HAND.

Dec. 31, 1910 ..... 2,674,757 tons.

Salesmen Met.—The Dravo - Doyle Co. held its seventh annual salesmen's meeting at the general offices of the company in room 808 Lewis block, Pittsburg, Jan. 20 and 21. Representatives of all the branch offices of the company were present and at the close of the meeting on Saturday the members adjourned to the University club on Grant boulevard, where an elaborate banquet was served.

The officers of the company are: President, Thomas E. Doyle; vice president, J. D. Berg; secretary, Benj. F. Harris; treasurer, R. M. Dravo.

Wadsworth Core Machine & Foundry Co.

George H. Wadsworth, inventor of the Wadsworth line of core room equipment, has made arrangements with the Falls Clutch & Machinery Co., Cuyahoga Falls, O., to purchase its entire core room equipment machinery, together with the stock on hand, tools and patterns, and after March 1 will continue this business under the firm name of the Wadsworth Core Machine & Equipment Co., with headquarters at Akron, O. A stock company is to be organized for the manufacture of this line of machinery. Mr. Wadsworth has resigned as superintendent of the Falls Clutch & Machinery Co., Cuyahoga Falls, O., successor to the Falls Rivet & Machine Co., after an affiliation extending over a period of 15 years, and this will give him an opportunity of devoting his entire time to the manufacture of core room equipment, in which line of work he has been engaged for the past ten years.

Republic Year Book

The Republic Iron & Steel Co. has just issued to customers and the trade its year-book for 1911 of announcements, prices, sizes, etc. It is one of the handsomest specimens of the compiler's science and the printer's art that the trade has received in many a day. Tastefully printed upon fine paper and bound in limp leather in a size most convenient both for carrying in the pocket as well as for finding a place on the desk for ready access, the taste displayed in its general makeup is equalled only by its every convenience contained therein. It contains every sort of ready reference table, such as weights, areas, etc., as well as exhaustive descriptions of every line of product manufactured by the Republic company.

Stockholders of the National Acme Mfg. Co., Cleveland, have been summoned to meet, Feb. 25, to vote on authorizing a capital increase from $1,500,000 to $2,500,000.

CRUDE STEEL

In Strong Demand from Canada—Heavy Exports.

New York, Feb. 1. (By wire.)

A scarcity of raw steel has developed among Canadian steel works because of increased demands for finished products made upon them by Dominion railroads and other large consumers. The Algoma Steel Works has closed for 15,000 tons of billets from the Illinois Steel Co., and an additional tonnage is being negotiated for this and other works. The Grand Trunk Pacific railroad is in the market for 61,000 tons of rails, and the Canadian Pacific is out for a larger amount. The two aggregate about 150,000 tons. Most of this business is expected to go to Great Britain because of the preferential duty.

Export business of the Corporation continues strong and last year reached about 1,500,000 tons, compared with about 1,250,000 tons for the preceding year.

BESSEMER SALE

Made at Price Which Has Prevailed for Past Five Months.

Pittsburg, Feb. 1. (By wire.)

A sale of 1,200 tons of Bessemer pig iron at $15, valley, for delivery over the next five months was noted. This is the first straight sale of Bessemer to a consumer for some time. Recent developments show several large blocks of basic pig iron in the hands of middlemen, but this iron is not being offered below $13.50, valley. The monthly average price of Bessemer pig iron for January is $15, valley, or $15.90, Pittsburg, the same as for the preceding four months. The average price of basic for January is given as $13.291, valley, or $14.191, Pittsburg, as compared with $13.446, valley, or $14.346, Pittsburg, for December.

Complete Catalog.—The Cleveland Twist Drill Co., Cleveland, has begun distributing its new catalog No. 37, which is one of the most complete in every detail. An innovation is its printing in parallel columns the prices of high speed and carbon steel drills and reamers of the same general style, thus making the booklet compact. The catalog is carefully illustrated and tastefully printed.

Warner Iron Co. blew out its Cumberland, Tenn., stack, Jan. 29, for an indefinite period.

DEMAND FOR MASTERS

In the Foundry Discussed in Pittsburg by T. D. West.

Thomas D. West, foundry expert and manager, Cleveland, O., on Jan. 26 delivered the first of a series of lectures to be given by the School of Applied Industries of the Carnegie Technical Schools, Pittsburg. Mr. West talked on "Modern Foundry Practice and its Demands" before members of the faculty, students of the school and members of the Pittsburg Foundrymen's Association. The speaker described the commercial and educational sides of modern foundry practice, its opportunities and the value of technical schools in supplying knowledge of foundry work. He pointed out that there are 6,549 foundries in the United States and Canada, of which only 557 are located in Canada, and quoted statistics showing the number of foundries in each state and the growth of the industry. By means of lantern slides, the speaker described the 50 distinct lines of castings, showing a number of views of modern plants. Among other things he said:

The art of founding is now most insistent in its demands for intelligence, experience and skill. To be masters, requirements are such that a craftsman could be trained from the cradle in order that his mature years might make him successful in avoiding the many ill effects and losses, that those lacking in a full training are sure to experience if they undertake to achieve results worthy the molder or shop manager. What is implied by the term master is not only the possession of intelligence and executive, but also the ability to show experienced molders how the work should be done, by doing it yourself if necessary, together with a technical knowledge of the principles involved in the work. One object of this lecture is to impress ambitious students with the great demand that exists for the creation of masters to fill coming needs. No mechanical vocation offers the vigorous master a more honorable and remunerative position than founding.

The prominence of specialties and the present deplorable unwillingness of youths to devote the time they should amidst the dirt and smut of a foundry in order rightly to learn the trade, is now so prevalent that the coming generation of founders will have few, if conditions are not changed, who could justly be called masters of the art. It is to be remembered that in losing the all-round masters, much that has been born of broad experience can pass from the trade to become lost arts. This is more readily discerned when it is known that most any fair, intelligent, all-round experienced molder possessing a fair technical knowledge of the trade's workings, should be able to improve the practice of many specialists who are lacking this general practical training. The speaker knows the truth of this, from the personal experience he has had in remedying the defects and difficulties such specialists have encountered in laboring to perfect their practices. Another factor serving to decrease the creation of masters, is the ill conception that some, having control of foundries and yet not going into bankruptcy, possess regarding the character of ability that should be engaged to manage them, who in time after having suffered great losses and berated the trade seem to have a better realization of needed qualifications. These erroneous conceptions of needs, failures and injuries would be much less were the value of the foundry master more widely proclaimed.

VALLEY OPERATIONS

Of Mills and Furnaces Reflect More Activity.

The Republic Iron & Steel Co. this week started its steel mills full time for the first time in several months. During the early part of November, 1910, the company's steel mills had a fair run, but this is the first time since June, 1910, that they have been operated full time. At the Brown-Bonnell Works, the steel mill, 20-inch and 10-inch skelp department, 7-inch and 8-inch contincous mill, No. 3 bar mill and the spike and washer factories resumed this morning and the two bar mills, the 7-inch mill, puddle mill and shafting works at the Monongahela Valley works were also started.

The sheet mills of the Youngstown Sheet & Tube Co., which were idle last week for repairs, are again in operation and the company is operating to greater capacity than for some time.

The new plate mill of the Youngstown Iron & Steel Co. likely will be started this week. The new jobbing mill is now in operation.

Five of the blast furnaces at the Ohio works of the Carnegie Steel Co. are operating this week.

The Ohio Seamless Tube Co., Shelby, O., has made an authoritative announcement that it is not looking for a new location and will not remove from Shelby. An effort was made by the chamber of commerce of Columbus, O., some time ago, to induce the company to locate in Columbus, but without success. The company states that the rumor that it planned to change its location might have started through confusion with the name of another plant in that city.

AS WIRE MAKER

Cambria Steel Co. Will Re-enter Market in Near Future.

The Cambria Steel Co, Johnstown, Pa., will enter the market in the manufacture of wire rods and wire products in the very near future. The new rod mill with a capacity of between 350 and 400 tons a day, will be started about Feb. 15, and the new wire mills with a capacity of from 300 to 350 tons per day will be placed in operation about April 1. The old Cambria Iron Co. was one of the largest manufacturers of wire prior to the Johnstown flood, but the plant was entirely destroyed by the flood in the spring of 1889, so that the completion of the new wire mills marks the re-entrance of the Cambria company into this field. The Cambria Steel Co. this week is operating 16 out of its 24 open-hearth furnaces, and five of its eight blast furnaces, one stack having been blown out during the past few days.

Late developments show that some makers of wire rods have advanced their prices to $29, Pittsburg, although $28.50, Pittsburg, has been done during the past few days. A few weeks ago Bessemer and open-hearth rods were selling around $27.50, Pittsburg.

Eastern Pennsylvania Furnace Operations

Reading, Pa., Jan. 31.

The majority of the blast furnaces throughout this district have continued in operation through the month of January and no change is expected during the coming month. The Reading Iron Co. has its two furnaces at Emaus and the Keystone at Reading in blast. The Robesonia, Sheridan, Lebanon, Steelton, Harrisburg, Warwick, of Pottstown, the Leesport and Birdsboro furnaces are also in blast. The furnaces at Topton, Alburtis and Temple have not been in blast for some time and thus far there are no prospects of early resumption.

The Seneca Chain Co., Kent, O., announces the opening of eastern sales offices at 30 Church street, Hudson Terminal building, New York City, in charge of W. A. Hengstenberg, vice president.

The new shops of the Louisville & Nashville railroad at Boyles, Ala., have been in part completed and will be placed in operation about May 1.

MIDLAND STEEL CO.

Sells Its Properties—Large Amount to be Expended on Steel Works.

The Crucible Steel Co. of America has purchased outright the holdings of the Midland Steel Co., Midland, Pa., on the Ohio river, about 37 miles from Pittsburg, and it is officially announced that a large sum of money will be expended by the new owners for new steel works at Midland. This transaction is one of the most important of its character in the Western Pennsylvania territory for some time and has attracted considerable attention.

A new company, to be known as the Pittsburg Crucible Steel Co., a subsidiary of the Crucible Steel Co. of America, has issued bonds to the amount of $7,500,000, to cover the cost of the purchase of the Midland Steel Co.'s properties and part of the improvements to be made at Midland by the newly organized company. The entire issue was sold Jan. 25 to the Union Trust Co., Pittsburg, and this company has already disposed of upward of $6,000,000 of the new issue to investment interests. The new bonds are guaranteed by the parent company, the Crucible Steel Co. of America. The bonds will bear interest at 5 per cent, are exempt from tax and the entire issue will be retired in 1945. Maturity begins Mar. 1, 1916, when $150,000 will be retired and an equal amount will be retired every year until the issue is entirely refunded.

The price paid for the Midland Steel Co.'s properties is understood to have been in the neighborhood of $3,000,000, which leaves $4,500,000 of the bond issue for improvements at Midland and it is understood that this amount will be increased later. Eventually the company will remove some of its plants in the immediate Pittsburg district to the new site at Midland. These include the Black Diamond Steel Works, formerly the Park Steel Co., in the Lawrenceville, Pittsburg, district; the Crescent Steel Works, Forty-ninth to Fifty-first streets, Pittsburg; the remainder of the Howe-Brown Co. works (a portion of this property was sold to the Pennsylvania railroad some time ago), Penn avenue and Seventeenth street, Pittsburg, and La Belle Works, Ridge avenue and Rebecca street, Northside, Pittsburg. A large part of the company's works within the city limits is located on leased properties, on which the leases will expire within the next few years. The newly acquired property at Midland consists of 423 acres of land, a modern blast furnace of 500 tons capacity, with foundations for a second furnace; 1,800 acres of coal land at Midland; 250 beehive ovens; 130 acres of limestone near New Castle Junction, Pa.; modern coal handling apparatus on the Ohio river; one ore-handling bridge; modern machine shop, a Uehling pig casting machine, etc. Improvements to be made include six or eight open-hearth furnaces, blooming and billet mills, a rod mill, an electric furnace, etc. Actual construction will be started as soon as plans for the new work are completed. The property at Midland is practically level and is regarded as one of the most desirable sites for steel plants in the Ohio valley. It is reached by the Cleveland & Pittsburg branch of the Pennsylvania Lines West. A United States government dam is now being constructed on the Ohio river, which will give the steel plant pool water to Pittsburg and up the Monongahela and Allegheny rivers. The site is sufficiently large to meet the expansion needs of the company for many years.

In 1904 the Crucible Steel Co. of America sold to the Carnegie Steel Co. its Clairton, Pa., plant, which consists of three blast furnaces; 12 50-ton open-hearth furnaces, with coal, limestone and ore deposits. At that time a 10-year contract was negotiated, whereby the Carnegie Steel Co. would furnish the Crucible Steel Co. its full requirements of pig iron and billets. The pig iron requirements aggregate approximately from 6,000 to 8,000 tons a month and a much larger tonnage of billets is involved. This contract will not expire until 1914, but it is understood that there is a clause in the contract made in 1904, relieving the Crucible Steel Co. from taking any part or all of the material involved, provided it should build or acquire properties to make it. By this transaction the Midland furnace, which was blown in in September, 1906, is removed from the list of merchant furnaces in Western Pennsylvania.

The Midland Steel Co. will not pass out of existence, although the company's plans for the future have not been announced. The company owns extensive coal deposits near Brownsville, Pa., and retains the town site at Midland, Pa. The officers of the company are: President, H. C. Fownes; vice president, J. Ramsey Speer; secretary William C. Fownes Jr.; treasurer, Charles McKnight.

The deal, was handled by J. H. Hillman & Sons, with offices in the Oliver building, Pittsburg, who had been working on the transaction for some time.

BUILD DIESEL ENGINES

St. Louis and German Capitalists Have Organized Company.

The Busch-Sulzer Bros. Diesel Engine Co., of St. Louis, has been incorporated with $2,100,000 capital stock. The officers and directors of the company, as announced by James R. Harris, second vice president and general manager, are: President, Adolphus Busch; first vice president, August A. Busch; second vice president and general manager, James R. Harris; Edward A. Faust, E. D. Meier, president of the American Society of Mechanical Engineers, New York City; Robert Sulzer, of Sulzer Bros., Winterthur, Germany; Eugene H. Angert, Rudolph Diesel, Munich, Germany; Daniel N. Kirby, of Nagel & Kirby, St. Louis attorneys.

Rudolph Diesel, of Munich, Germany, one of the directors of the new company, is the inventor of the Diesel engine.

Contract for Bulk Freighter

The Wisconsin Steel Co., which is a subsidiary of the International Harvester Co., of Chicago, has given a contract to the American Ship Building Co. for a bulk freighter to be 545 feet over all, 525 feet keel, 58 feet beam and 31 feet deep, to be built on the Isherwood system. Her engines will be triple-expansion with cylinders 23½, 38 and 63 inches in diameter, with stroke of 42 inches, supplied with steam from two Scotch boilers, 15 feet in diameter and 11½ feet long. She will probably be built at the Lorain yard.

Titanium Specified

The announcement recently made by the New York Central lines that included in its 175,000-ton steel rail order are 41,500 tons of titanium Bessemer rails has proved interesting alike to rail makers and buyers. The specifications on titanium rails call for the use of 1 per cent of the 10 per cent titanium alloy (or equivalent Ti) which will therefore require more than 400 tons of the 10 per cent alloy. The strength of the Ti content may be increased to 15 per cent, thus requiring a proportionately smaller quantity of alloy, but the requisition in any event will make the largest single order ever placed for alloy steel rails.

RAIL ORDERS

Placed by Several Roads—Union Labor Defeats Low Bidder.

New York, Feb. 1. (By wire.)

The Rock Island has placed 10,000 tons of rails with the Illinois Steel Co., which reports 10,000 scattering. The New York Central rail contracts were formally signed today. The Corporation received 87,500 tons.

Structural bookings for January were 90,000, of which 30,000 went to the American Bridge Co. The contract for the Vine Street pier, Philadelphia, 3,000 tons, was awarded to W. S. P. Shields over the low bid of the McClintic-Marshall Construction Co., which was rejected because of union labor opposition.

Personal

H. H. Pleasance, assistant sales agent for the Cambria Steel Co., at Cleveland, is making his headquarters at Detroit.

Wilmer Wickersham, sales manager of the Pope Tin Plate Co., Steubenville, O., has resigned after 15 years service with that company.

S. T. Toby has been made purchasing agent of the New York Air Brake Co., effective Jan. 24. Mr. Toby has been assistant purchasing agent.

Wade A. Taylor, president of the Deforest Sheet & Tin Plate Co., Niles, O., has been elected president of the Dollar Savings Bank, also of that city.

Thos. Neal, formerly connected with the Acme White Lead Co., has accepted the position of president of the General Motors Co., with headquarters at Detroit.

C. E. Brainard, formerly connected with the Alden Sampson Co., has accepted a position with the machinery department of the Chas. A. Strelinger Co., Detroit.

Carl E. Vogel, newly appointed superintendent of the Omaha Structural Iron & Steel Co., Omaha, Neb., has taken up his new duties and is erecting the new shops of the company.

M. E. Applebaum has resigned as president, treasurer and director of the New York Metal Selling Co., New York City, but will retain his interest in the metal and ore selling trade under his own name.

J. A. Henry, who has been purchasing agent for the Portsmouth Steel Co., Portsmouth, O., has been placed in charge of the campany's new office at Cincinnati. He will be succeeded by Charles Simms, former paymaster.

Exile Burkitt, general manager of the Southern Engine & Boiler Works, Jackson, Tenn., has resigned to become manager of the Southern Motor Works at Nashville, Tenn. The engine company has one of the largest plants in Tennessee.

W. W. Broughton, formerly general traffic manager for the Great Northern railroad, has been appointed vice president of the Pittsburg Coal Co., succeeding C. E. Wales. He will have offices in Duluth and will have charge of the coal lands and business of the company in the northwest.

C. A. Johnson, president of the Gisholt Machine Co., Madison, Wis., and E. T. Hendee, assistant to the president of Joseph T. Ryerson & Son, Chicago, sailed for Europe on the Mauritania, Wednesday, Feb. 1. It is their intention to be gone at least a month and the trip is made in connection with the foreign business of both companies.

E. B. Blandy, who has recently been sales manager of the United Steel Co., Canton, O., at Pittsburg, has become associated with Pilling & Crane, of Philadelphia, and will have charge of the pig iron selling of that house in the New York territory, with offices at 71 Broadway. Mr. Blandy is an experienced pig iron man, having been connected for many years with the sales department of the Tennessee Coal, Iron & Railroad Co.

J. A. Houston, division contracting manager of the American Bridge Co. in the Pittsburg district, with headquarters at Pittsburg, has retired, and has been succeeded by R. W. Bailey, who has been promoted from contracting manager at Philadelphia. W. B. Ogram, contracting manager of the Buffalo office, has been placed in charge of the Philadelphia office, and this vacancy has been filled by the advancement of Frank D. Rideout, of the Pittsburg office. Mr. Houston retires after a long and prominent affiliation with the fabricated steel trade of the country.

Obituary

Alexander Sharpe, of the Hudson & Sharpe Co., founder, Green Bay, Wis., is dead as the result of burns received in an explosion of gasoline at the foundry, aged 58.

Calvin B. Orcutt, president of the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., died Jan. 30, in Johns Hopkins hospital, Baltimore, from intestinal trouble. He was 63 years of age.

J. M. Anderson, aged 54 years, formerly superintendent of the iron works of Magee & Co., Brownsville, Pa., and the Cannonsburg Iron & Steel Co., Cannonsburg, Pa., and later treasurer of Allegheny county, Pa., died on Jan. 27, at his home at Pittsburg, Pa.

The death of J. E. Schwitzer, chief engineer of the Canadian Pacific railway, occurred Jan. 23 at the Royal Victoria hospital, Montreal. He was promoted only a few weeks ago from the position of assistant chief engineer at Winnipeg, and took pneumonia a day or two after his arrival at Montreal.

Frank M. Stearns, the father of Frank B. Stearns, president of the Stearns Automobile Co., Cleveland, died at his home in that city on Jan. 30. He was 79 years of age. Athough he had devoted his time to other interests during the latter part of his life, Mr. Stearns was at one time an iron founder of some prominence. He founded the Berea Stove Co., near Cleveland, about 1860, this being the first plant of this kind in that vicinity. Mr. Stearns was a director of the Stearns Automobile Co.

James M. Nash, superintendent of the wire department of the Monessen, Pa., plant of the Pittsburg Steel Co., aged 48, died Jan. 30, at his home, Monessen, Pa. Mr. Nash was born in Pembrokeshire, Eng., and in 1890 came to America, settling in St. Louis, where he was connected with wire mills. Three years later he went to Rankin, Pa., where he was placed in charge of the wire department of the American Steel & Wire Co.'s plant. Seven years ago Mr. Nash went to Monessen as superintendent of the Pittsburg Steel Co.'s plant. A brother, George Nash, is general manager of the Monessen plant.

Jeremiah J. Keenan, founder and owner of the Lake Erie Iron Works, Cleveland, died at his home in that city, Jan. 26, aged 72. His death was due to old age, superinduced by an attack of grip. Mr. Keenan was born in Ireland, learned the trade of boilermaker in Cleveland, and, after he had served his apprenticeship, entered the boiler shop of the old Globe Iron Works. Of this shop he soon became foreman, which position he held for a quarter of a century. About 25 years ago he left the Globe Iron Works to go into business for himself. The Lake Erie Boiler Works was the result of his venture. Mr. Keenan remained the active head of this concern until his death.

Crucible Plant.—The new steel plant built by the Simonds Mfg. Co., Fitchburg, Mass., at Lockport, N. Y., was recently placed in operation. The work of construction was commenced nearly a year ago. The steel is made by the crucible process.

The New York stock market continued dull and professional throughout the week, but a strong undertone was shown when traders attacked prices. The results of the New York City bond sale on Tuesday did not have any special effect, and bonds generally continued dull and steady.

Stocks on Monday were very irregular, prices finally closing lower; cotton declined. The feature on Tuesday was the bidding on the New York City offer of $60,000,000 4¼ per cents, the issue being over-subscribed five times, and the average price realized being 100.904, compared with 101.28 realized for the same kind of bonds last March; the stock market was extremely dull and irregular, but prices closed higher. Less activity was shown Wednesday. Thursday was the dullest day for weeks, prices moving within narrow limits to average higher at the close; the Bank of England reduced its minimum rate of discount from 4½ to 4 per cent. On Friday stocks turned stronger in the final hour, and closed at practically the highest average of the present movement; wheat was weak and lower. Moderate activity was shown Saturday, and prices reached the highest on the movement.

Call money ranged between 2¾ and 2⅛ per cent, and time money was offered with great freedom during the week. The total actual surplus of clearing house banks was $37,776,000. The actual figures also showed the following changes in clearing house banks: Surplus decreased $1,924,450; loans increased $45,525,500; deposits increased $57,862,600, and the ratio of reserve, 27.8, compared with 28.1 the previous week. Non-member banks and trust companies showed loans increased $4,514,200; total deposits increased $13,669,800, and the percentage of reserve 17.4, compared with 17.5 the previous week. Commercial failures for the week were 351, compared with 337 the preceding week, and 316 the corresponding week last year. The fortnightly railway figures showed the surplus of idle cars stands at 114,820, compared with 106,924 two weeks previous. Bank clearings were smaller than in any previous week of the year, and fell below the corresponding week a year ago by 13 per cent. Shares were sold to the number of 2,174,600, compared with 2,753,000 the preceding week, and 5,882,700 the corresponding week last year. Bonds, exclusive of government bonds, were sold to the amount of $15,764,000, compared with $21,864,000 the preceding week, and $18,096,000 the corresponding week last year.

	Closing Quo. Jan. 28	Changes in week	Annual Meeting date 1911		Stock Outstanding	Basis	Dividend Last Dividend	Dividend Date Last Div. Pay.
Allis-Chalmers	7⅞	— ⅛			$19.820.000			
Allis-Chalmers, pr	31	+3	Nov.	2	16,150,000	7 cum.	1¾ Q.	Feb., 1904
American Can	9⅞	+ ⅜	Feb.	1	41,233,300		1¾ Q.	
American Can, pr	81½	+2			41,233,300	7 cum.	1¼ Q.	Jan., 1911
Am. Car & Fdy	54¼	+1¼	June	29	30,000,000		½ Q.	Jan., 1911
Am. Car & Fdy., pr	117	—1			30,000,000	n. c.	1¾ Q.	Jan., 1911
American Loc	40⅜	+ ¼	Oct.	17	25,000,000	5	1¼ Q.	Aug., 1908
American Loc., pr	110¼	+ ¼			25,000,000	7 cum.	1¾ Q.	Jan., 1911
American Ship	75	.....	Oct.	11	7,600,000	4	1 Q.	Sept., 1910
American Ship, pr	111	+ ½			7,900,000	7 cum.	1¾ Q.	Jan., 1911
Am. Steel Foundries	45¾	—¾	Dec.	7	17,184,000		1¼ Q.	Feb., 1911
Barney & Smith	20	.....	June	6	2,000,000	4	1 Q.	June, 1908
Barney & Smith, pr	85	.....			2,500,000	8 cum.	2 Q.	Dec., 1910
Bethlehem Steel	32⅞	+2⅝	April	4	14,862,000			
Bethlehem Steel, pr	61⅞	+1¼			14,908,000	7 n. c.	¾ Q.	Feb., 1907
Cambria Steel	45	+ ½	Mar.	21	45,000,000	5	1¼ Q.	Feb., 1911
Cambria Iron	46	.....			8,468,000*	4	2 S. A.	Oct., 1910
Chicago Pneumatic Tool	44¾	+2¾	Feb.	20	6,485,800	4	1 Q.	Jan., 1911
Colorado Fuel	35¼	+1	Oct.	16	34,235,500		1¼ Q.	Apr., 1902
Crucible Steel	12½	.....	Oct.	18	24,578,400		3½.	
Crucible Steel, pr	77	+1¼			24,463,500	7 cum.	1¾ Q.	Dec., 1910
Empire Steel	7	+2	Feb.	22	1,254,770			
Empire Steel, pr	55	.....			2,500,000	6 cum.	2 S. A.	Jan., 1911
Fay & Egan	70	.....	Feb.	21	1,000,000	6	3 S. A.	Feb., 1909
Fay & Egan, pr	110	.....			1,000,000	7 cum.	1¾ Q.	Nov., 1910
General Electric	152⅛	— ⅛	May	9	65,179,600	8	2 Q.	Jan., 1911
Harbison-Walker	34	+ ½	Jan.	16	18,000,000		½ Q.	Dec., 1910
Harbison-Walker, pr	95	.....			9,600,000	6 cum.	1½.	Jan., 1911
International Pump	40¼	— ¼	May	9	17,762,500		1 Q.	Nov., 1910
International Pump, pr	85	— ⅜			1[illegible]350,000	6 cum.	1½ Q.	Feb., 1911
Lackawanna Steel	35	.....	Mar.	8	34,[illegible]3,000			
Lake Sup. Corp.	28½	.....	Oct.	4	40,000,000			
New York Air Brake	72	.....	Mar.	8	10,000,000	8	1½ Q.	Jan., 1911
Niles-Bement-Pond	98	.....	Feb.	8	8,500,000	6	1½ Q.	Dec., 1910
Niles-Bement-Pond, pr	104	.....			2,000,000	6 cum.	1½ Q.	Nov., 1910
Otis Elevator Co	49	.....	Mar.	20	6,375,000	3	1½ S. A.	Oct., 1910
Otis Elevator Co., pr	96	.....			6,310,000	6 n. c.	1½ Q.	Jan., 1911
Pa. Steel	60	.....	May	8	10,750,000			
Pa. Steel, pr	106	— ½			16,500,000	7 n. c.	3½ S. A.	Nov., 1910
Pittsburg Coal Co	19½	+1	Feb.	10	28,104,600			
Pittsburg Coal Co., pr	68	— ⅞			27,071,800	7 cum.	1¾ Q.	Jan., 1911
Pressed Steel Car	33¼	+ ⅞	Feb.	15	12,500,000		1 Q.	Aug., 1904
Pressed Steel Car, pr	97	+1½			12,500,000	7 n. c.	1¾ Q.	Feb., 1911
Pullman	161	— ¼	Nov.	8	120,000,000	8	2 Q.	Feb., 1911
Railway Stl. Spring	34¾	.....	Mar.	2	13,500,000	2	1 S. A.	Oct., 1908
Railway Stl. Spring, pr	97¾	+2¼			13,500,000	7 cum.	1¾ Q.	Dec., 1910
Rep. Iron & Steel	34¾	+2¼	Oct.	18	27,191,000			
Rep. Iron & Steel, pr	96⅛	+1⅞			25,000,000	7 cum.	1¾ Q.	Jan., 1911
Sloss-Sheffield	50	—1½	Mar.	15	10,000,000	5	1¼ Q.	Sept., 1910
Sloss-Sheffield, pr	114½	.....			6,700,000	7 n. c.	1¾ Q.	Jan., 1911
U. S. Pipe & Fdy. Co	16	.....	June	28	12,106,300	2	1 Q.	Dec., 1910
U. S. Pipe & Fdy. Co., pr	51	.....			12,106,300	7 n. c.	1¼ Q.	Dec., 1910
U. S. Steel	78⅝	+1½	April	17	508,302,500	5	1¼ Q.	Dec., 1910
U. S. Steel, pr	119⅜	+ ½			360,281,100	7 cum.	1¾ Q.	Nov., 1910
U. S. Steel 5s	104⅝	+ ¼			463,798,000	5		
Va. Iron, Coal & Coke	59¾	— ¼	Sept.	19	9,073,680		5. †	Oct., 1907
Westinghouse Electric	66⅞	— ⅝	July	26	3,998,700*		5¼ Q. **	Jan., 1911
Westinghouse Air Brake	140⅜	— ½	Oct.	3	13,750,000*		5 Q. ‡	Jan., 1911

Par value of shares, $100, except those starred (*), $50.
**Includes 3¼ per cent on back dividends.
†Stock.
‡Includes 1½ extra and 1 special.

Copper Stocks.

New York.—Amalgamated Copper closed 62½, net loss of 1⅜.

Boston.—Butte Coalition closed 19, a net gain of ½c; Calumet & Arizona closed 19, a net gain of ½; Calumet & Hecla closed 505, a net loss of 10; North Butte Mining closed 27¼, a net loss of 1¾; Quincy Mining closed 66, net loss of 4.

Financial Notes.

Butte Coalition has declared the regular quarterly dividend of 25 cents a share, payable March 9.

The National Lead Co. has declared the regular quarterly dividend of 1¾ per cent on its preferred stock, payable March 15.

The Pressed Steel Car Co., Pittsburg, has declared a regular quarterly dividend of 1¾ per cent on preferred stock, payable Feb. 23.

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February	5,703
March	5,754
April	5,793
May	5,827
June	5,842
July	5,864
August	5,875
September	5,895
October	5,955
November	5,993
December	6,026
January, 1911	6,058

February 2, 1911

Boycotts and Courts

The American Anti-Boycott Association, which has rendered valuable service in determining the rights of employers and employes in the conduct of industrial disputes, has called our attention to a notable decision recently rendered by Justice Blackmar, of the New York supreme court, in the case of Albro J. Newton Co. against the Carpenters' union. While the decision directly affects labor conditions in the state of New York, it will have an effect throughout the country, for what the association has accomplished in this instance for the building trades of Greater New York, may be applied in other states and other industries.

Many men who would not commit personal violence or set fire to buildings do not hesitate to enter into a conspiracy to destroy good will, which is often more valuable than other property. The court says that while good will is intangible, it is subject to bargain and sale and may be capitalized as the basis of a corporate stock issue, and is often the most important asset possessed by a manufacturer or merchant. Hence, to bring the obstinate manufacturer to terms, an attack on his good will may be fully as effective as to tear down his factory or to smash him or his machinery. The court says:

Certain methods and weapons the law permits. Others it prohibits. It permits the strike on the one side and the lockout on the other. But each combatant must respect the rights of the other guaranteed by our constitution. Among these are life, liberty and property. Violence against persons and tangible property will not be permitted. Neither will attacks on intangible property rights, like business, good will or trade, be permitted. One cardinal principle must be borne in mind, that any element of illegality essential to a scheme or combination makes the whole illegal. This principle the defendants have overlooked. They have found a lawful means, viz., strikes, and an ultimate lawful end, viz., the improvement of labor; but they have forgotten that the very turning point in their scheme, and which alone makes it effective, is the coercion of plaintiff by injuring property rights. This is exactly what the defendants intended, it is what they have done, and it is unlawful.

An injunction recently issued by a Colorado court restrains the defendants from interfering, and from combining or confederating or conspiring or attempting to interfere with the plaintiff's business, or his conduct and pursuance of business as the plaintiff sees fit. This clearly prohibits boycotting. Such decisions as those handed down in New York and Colorado, will do much to clarify the atmosphere and prevent unjust assaults upon good will by means of the boycott, but interest continues to center in the contempt proceedings against Gompers, Mitchell and Morrison, upon which arguments were heard in the supreme court of the United States last week. It is earnestly hoped that the decision of this august tribunal will be in harmony with the progressive ideas recently expressed by lower courts.

Tin Plate and Pig Tin Manipulation

The manipulation of the pig tin market by a foreign syndicate, supposed to be composed of French and German capitalists, aided by one or more London tin brokers, threatens to force an advance in the tin plate market, when the tin plate manufacturers would much prefer to be let alone. It was more than 14 months ago that the present tin plate price was established, and the market has not advanced or declined since. No other finished steel product of importance has made any such record, with the sole exception of standard sections of steel rails. Nominally, at least, their price has not changed for almost ten years. All other steel products suffered declines in 1910, the declines ranging from $3 a ton upwards.

The price of tin plate is customarily considered in its relation to the prices of the two principal raw materials, steel and pig tin. Approximately 20 boxes of 100-pound plates are obtained from a long ton of sheet bars, while about 2 pounds of tin are consumed in coating a box. Thus with $24 sheet bars the steel would cost $1.20 per box of tin plate, and two pounds of tin at 40 cents would bring the cost of the two items to $2, the present market price being $3.60 for 100-pound coke tin plates. The remaining $1.60 is distributed in freights on raw materials, minor supplies, fuel for heating, annealing and power, acid, flux, oil, box, etc., and frequently profits, though the latter are never large per box.

No average has ever been computed as the basing ratio between steel and tin on the one hand and tin plates on

the other, as the relations are continually changing. A fair basis for comparative purposes can be obtained by taking the experience of 1908, for it chances that in that year the price of tin plate did not alter. On Jan. 8, 1908, there was a reduction of 20 cents a box, to a net price of $3.65, and this price ruled throughout the year. The average price of sheet bars in 1908, there being a total decline of about $3 a ton during the year, was about $28, while the average price of tin was 29½ cents. Today's sheet bar price is $24, and the decline of $4 a ton means about 20 cents per box of tin plate, which deducted from $3.65 would leave $3.45. As the actual price today is $3.60, there is 15 cents margin to be allowed on pig tin, which added to 29½ cents makes 37 cents. Accordingly we have it that with today's prices of tin plate and sheet bars tin should be 37 cents, and every cent in pig tin above that should mean 2 cents per box on tin plate, justifying a 10-cent advance in tin plates on 42-cent tin, another 10-cent advance on 47-cent tin, and so on.

The foreign tin syndicate celebrated the fact that our metal market was closed on Thanksgiving Day by pushing the price far over the 37-cent level, and ever since the New York market has been higher. Last week saw perhaps the most spectacular advance in the movement, Monday's close in New York being 41.80 cents and Friday's 43.75 cents, an advance of practically 2 cents in four business days.

While the trade holds the syndicate wholly responsible for the advance, it must be candidly admitted that the syndicate has probably not manufactured the whole rise. Rather it has seized upon conditions favorable for a rise and has added to the movement which the natural laws of supply and demand would have brought about. The question is simply how much is natural and how much is artificial in this advance. The metal lends itself particularly well to such movements, as production and consumption may almost be said to be on opposite sides of the globe, and stocks do not require much room. In these days when one hears so much about piles of pig iron the fact that a large lot of tin need not be conspicuous is quite interesting. The world's consumption of tin is only about 100,000 tons in a year, less in weight than the pig iron output of one blast furnace.

YEAR'S OUTPUT

Of All Kinds of Pig Iron Made in United States.

The total output of all kinds of pig iron in the United States for 1910, as compiled by the American Iron and Steel Association from complete statistics received from manufacturers was 27,298,545 gross tons, compared with 25,795,471 tons in 1909, an increase of 1,503,074 tons or over 5.8 per cent.

The production of Bessemer and low phosphorus iron was 11,244,612 tons, compared with 10,557,370 tons in 1909. The output of basic iron was 9,084,520 tons, compared with 8,250,225 tons in 1909. The production of spiegeleisen and ferro-manganese was 224,431 tons, compared with 225,040 tons in 1909.

The output classified by fuels was: From bituminous coke and coal, 26,255,086 tons, compared with 24,721,037 tons in 1909; from mixed anthracite and coke, 649,082 tons, compared with 698,431 tons in 1909; from anthracite alone, 20,503 tons, compared with 16,048 tons in 1909; from charcoal, 394,377 tons, compared with 376,003 tons in 1909.

Machinery Ordered

The list of machinery for the Corey, Ala., plant of the American Steel & Wire Co., prepared by that company some time ago, has been awarded to the Dewstoe Machinery Co., of Birmingham, Ala. The award was made through the Cleveland office of the American Steel & Wire Co.

The St. Louis Blast Furnace Co., whose plant had been shut down since August for repairs and improvements, started its fires, Jan. 25, preparatory to blowing in before the close of the week. The repairs and improvements represent an outlay of upwards of $50,000. The furnace has been partly relined, a new bosh and cinder pot have been put in, and an ore crusher plant installed. The company has enough orders on its books to keep the plant busy at least five months.

COMPENSATION LAW

Will Have Close Study by Illinois Manufacturers.

The Illinois Manufacturers' Association will take an active part during the present session of the legislature in a campaign to pass an employers' liability statute which will in effect be a workman's compulsory compensation act. This action was taken following an address by Charles Piez, president of the Link Belt Co., and a member of the Illinois commission named to study conditions and frame a workman's compensation bill, given at a luncheon at the Hotel Sherman, Jan. 24. At the close of his address, Mr. Piez made the following recommendations:

I would strongly advocate that this association place itself on record as favoring the presentation of a compensation act at this session of the legislature, and that it request its representatives on the commission to endeavor to secure a bill which shall have the support of the full commission. I further would advocate, in case the commission disagrees solely on the amount of compensation and the method of computing it, that a bill be presented to the legislature with alternative provision on these two points, leaving it to the legislature to decide after argument by both sides. And, finally, I would recommend in case a compensation measure is passed, that the Illinois Manufacturers' association organize its own accident mutual insurance company and that the attorney of the association be requested to determine whether under the present insurance laws such a mutual insurance company can be organized.

The only established form of redress which an American workman has against his employer for an injury suffered in the course of employment is an action at law. The common law holds the employer liable only when the accident is due to his fault or neglect. It relieves him of liability when the accident is laid to the risk of the industry, which is supposedly assumed by the workman, when it is due to the act of a fellow servant, or when the workman's own negligence contributed to the injury. When you consider that in the majority of cases the workman is without fault himself, that necessity leaves him but little choice in the selection of his employment, that he can exercise but scant control over his fellow servants, that even when he resorts to law, relief is given only after months of weary waiting, you can understand the reason for his bitter criticism of the present system. And contrast the increasing necessities of the injured man and his family with the assumed opulence of the employer, and you will find justification even for the charge of blood money.

TOTAL PRODUCTION OF PIG IRON IN THE UNITED STATES IN 1909 AND 1910.

Statistics collected from the Manufacturers by The American Iron and Steel Association, all in Gross Tons of 2,240 pounds.

Production in 1910, 27,298,545 Gross Tons; in 1909, 25,795,471 Tons; in 1908, 15,936,018 Tons; and in 1907, 25,781,361 Tons.

Total Production of All Kinds of Pig Iron.

TOTAL PRODUCTION OF PIG IRON BY STATES.

States.	Blast Furnaces. In blast June 30, 1910.	Dec. 31, 1910. In.	Dec. 31, 1910. Out.	Dec. 31, 1910. Total.	Production—Gross tons. (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.) First half of 1910.	Second half of 1910.	Total for 1910.
Massachusetts	1	1	1	2	7,505	9,077	16,582
Connecticut	2	3	0	3			
New York	18	15	14	29	1,017,951	920,456	1,938,407
New Jersey	3	2	7	9	155,087	109,694	264,781
Pennsylvania	116	74	90	164	6,065,688	5,206,432	11,272,120
Maryland	4	2	3	5	170,708	155,506	326,214
Virginia	11	9	17	26	244,275	200,701	444,976
Georgia	0	1	3	4	6,725	4,000	10,725
Texas	0	0	4	4			
Alabama	24	20	30	50	1,012,545	926,602	1,939,147
West Virginia	1	1	3	4	137,439	37,222	174,661
Kentucky	3	2	6	8	46,520	53,989	100,509
Tennessee	12	10	10	20	235,969	161,600	397,569
Ohio	50	35	41	76	3,210,562	2,540,505	5,751,067
Illinois	20	11	15	26	1,552,160	1,123,486	2,675,646
Indiana	6	3	6	9	716,832	533,271	1,250,103
Michigan	11	9	7	16			
Wisconsin	4	4	3	7	170,814	136,612	307,426
Minnesota	1	1	0	1			
Missouri	2	1	1	2			
Colorado	4	2	4	6			
Oregon	0	0	1	1	227,958	200,654	428,612
Washington	0	0	1	1			
California	0	0	0	0			
Total	293	206	267	473	14,978,738	12,319,807	27,298,545

PRODUCTION OF BITUMINOUS COAL AND COKE PIG IRON.

New York	18	15	7	22	1,017,901	920,456	1,938,357
New Jersey	3	2	5	7	152,975	109,694	262,669
Pennsylvania	98	61	62	123	5,688,738	4,932,270	10,621,008
Maryland	4	2	2	4	170,108	155,506	325,614
Virginia	11	8	14	22			
Georgia	0	1	1	2	247,731	202,611	450,342
Texas	0	0	3	3			
Alabama	23	17	28	45	997,206	906,237	1,903,443
West Virginia	1	1	3	4	137,439	37,222	174,661
Kentucky	2	2	5	7	45,963	52,988	98,951
Tennessee	11	9	9	18	234,393	159,685	394,078
Ohio	49	35	36	71	3,210,542	2,539,465	5,750,007
Illinois	20	11	15	26	1,552,160	1,123,486	2,675,646
Indiana	6	3	6	9	673,580	520,442	1,194,022
Michigan	2	1	3	4			
Wisconsin	3	3	3	6			
Minnesota	1	1	0	1			
Missouri	1	0	1	1	253,610	212,678	466,288
Colorado	4	2	4	6			
Washington	0	0	1	1			
Total	257	174	208	382	14,382,346	11,872,740	26,255,086

ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

New York	0	0	5	5	376,739	272,343	649,082
New Jersey	0	0	2	2			
Pennsylvania	14	10	25	35			
Total	14	10	32	42	376,739	272,343	649,082

PRODUCTION OF CHARCOAL PIG IRON BY STATES.

Massachusetts	1	1	1	2	*7,555	9,077	*16,632
Connecticut	2	3	0	3			
New York	0	0	2	2	2,323	1,819	4,142
Pennsylvania	4	3	3	6			
Maryland	0	0	1	1	965	590	1,555
Virginia	0	1	3	4			
Alabama	1	3	2	5	15,339	20,365	35,704
Georgia	0	0	2	2			
Texas	0	0	1	1	5,037	4,416	9,453
Kentucky	1	0	1	1			
Tennessee	1	1	1	2			
Ohio	1	0	5	5	20	1,040	1,060
Michigan	9	8	4	12	155,740	105,065	260,805
Wisconsin	1	1	0	1			
Missouri	1	1	0	1	*32,674	*32,352	*65,026
Oregon	0	0	1	1			
California	0	0	0	0			
Total	22	22	27	49	*219,653	*174,724	*394,377

* Includes a small quantity of pig iron made with charcoal and electricity.

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Bituminous	257	174	208	382	14,382,346	11,872,740	26,255,086
Anth. & anth. & coke	14	10	32	42	376,739	272,343	649,082
Charcoal	22	22	27	49	219,653	174,724	394,377
Total	293	206	267	473	14,978,738	12,319,807	27,298,545

Miscellaneous Pig Iron Statistics.

PRODUCTION OF PIG IRON IN PENNSYLVANIA AND OHIO.

	Districts.	Blast Furnaces. In blast June 30, 1910.	Dec. 31, 1910. In.	Dec. 31, 1910. Out.	Dec. 31, 1910. Total.	Production—Gross tons. (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.) First half of 1910.	Second half of 1910.	Total for 1910.
Pennsylvania.	Lehigh Valley	16	12	14	26	369,529	389,721	759,250
	Schuylkill "	10	8	9	17	404,583	398,779	803,362
	L. Susq. "	10	8	9	17	358,511	284,759	643,270
	Juniata "	3	3	6	9	93,557	97,997	191,554
	Allegheny Co.	38	23	24	47	2,895,729	2,435,169	5,330,898
	Shenan. Valley	20	9	14	23	1,041,381	883,138	1,924,519
	Miscel. bitum.	15	8	11	19	900,075	715,050	1,615,125
	Charcoal	4	3	3	6	2,323	1,819	4,142
Ohio.	Mahoning Val.	20	14	9	23	1,345,926	1,189,043	2,534,969
	Hocking "	0	0	1	1	866,805	607,660	1,474,465
	Lake Counties	10	6	10	16			
	Miscel. bitum.	10	8	8	16	722,360	562,370	1,284,730
	H. R. bitum.	9	7	8	15	275,451	180,392	455,843
	H. R. charcoal	1	0	5	5	20	1,040	1,060

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

New York	464,263	370,369	834,632
Pennsylvania	2,466,797	1,927,110	4,393,907
Maryland	170,108	155,506	325,614
Virginia, West Va., Kentucky, and Tenn.	184,281	84,296	268,577
Ohio	1,942,374	1,517,330	3,459,704
Illinois	1,035,681	790,726	1,826,407
Michigan, Wisconsin, Minn., Col., and Cal.	60,379	75,392	135,771
Total	6,323,883	4,920,729	11,244,612

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON IN PENNSYLVANIA AND OHIO BY DISTRICTS.

Pennsylvania.	Lehigh Valley	88,370	76,606	164,976
	Schuylkill Valley			
	Lower Susquehanna Valley	59,374	67,089	126,463
	Allegheny County	1,322,242	1,029,909	2,352,151
	Shenango Valley	996,811	753,506	1,750,317
	Miscellaneous bituminous			
Ohio.	Mahoning Valley	873,483	865,424	1,738,907
	Lake Counties	505,261	325,673	830,934
	Hanging Rock bituminous	563,630	326,233	889,863
	Miscellaneous bituminous			

PRODUCTION OF BASIC PIG IRON, NOT INCLUDING CHARCOAL IRON.

New York and New Jersey	274,032	140,196	414,228
Pennsylvania—Allegheny County	1,480,013	1,327,452	2,807,465
Other counties	1,228,391	1,211,134	2,439,525
Virginia and Alabama	392,559	304,818	697,377
Ohio	612,331	543,090	1,155,421
Indiana, Illinois, Missouri, and Colorado	956,616	613,888	1,570,504
Total	4,943,942	4,140,578	9,084,520

PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

Pennsylvania	91,381	65,218	156,599
Illinois	39,566	28,266	67,832
Total	130,947	93,484	224,431

PRODUCTION OF ALL KINDS OF PIG IRON FROM 1906 TO 1910.

States—Gross tons.	Production—(Includes spiegeleisen, ferro-manganese, etc.) 1906.	1907.	1908.	1909.	1910.
Massachusetts	20,239	19,119	13,794	18,388	16,582
Connecticut					
New York	1,552,659	1,659,752	1,019,495	1,733,675	1,938,407
New Jersey	379,390	373,189	225,372	294,474	264,781
Pennsylvania	11,247,869	11,348,549	6,987,191	10,918,824	11,272,120
Maryland	386,709	411,833	183,502	286,856	326,214
Virginia	483,525	478,771	320,458	391,134	444,976
Georgia	92,599	55,825	24,345	26,072	10,725
Texas					
Alabama	1,674,848	1,686,674	1,397,014	1,763,617	1,939,147
West Virginia	304,534	291,066	65,551	228,282	174,661
Kentucky	98,127	127,946	45,096	86,371	100,509
Tennessee	426,874	393,106	290,826	333,845	397,569
Ohio	5,327,133	5,250,687	2,861,325	5,551,545	5,751,067
Illinois	2,156,866	2,457,768	1,691,944	2,467,156	2,675,646
Indiana	369,456	436,507	348,096	964,289	1,250,103
Michigan					
Wisconsin	373,323	322,083	148,938	348,177	307,426
Minnesota					
Missouri					
Colorado	413,040	468,486	313,071	382,766	428,612
Washington					
California					
Total	25,307,191	25,781,361	15,936,018	25,795,471	27,298,545

IN DOUBT

Is Final Outcome of Trade Agreement—Metal Trades Election.

At the fourth annual meeting of the California Metal Trades Association held Jan. 25 in the Association Assembly Hall, Hooker & Lent building, 503 Market street, San Francisco, the following officers and executive committee were elected for ensuing year:

President, Sam J. Eva, United Engineering Works; first vice president, Constant Meese, Meese & Gottfried Co.; second vice president, George J. Henry Jr., Pelton Water Wheel Co.

Executive committee, C. H. Evans, C. H. Evans & Co.; O. H. Fischer, Union Gas Engine Co.; Andrew L. Kerr, Steiger & Kerr Stove & Foundry Co.; John A. McGregor, Union Iron Works Co.; R. H. Postlethwaite, Risdon Iron & Locomotive Works; P. H. Reardon, Compressed Air Machinery Co.; Otto Schrader, Schrader Iron Works, Inc.; John T. Scott, Moore & Scott Iron Works.

J. M. Robinson, of the Keystone Boiler Works, the retiring president of the association, in his annual report said in part:

President's Report.

That there did exist a decided division of opinion as to what had been accomplished by this association as a result of its many months of effort to bring into being a trade agreement that would prove acceptable, none who was in attendance at our last meeting will deny. And it is an accepted fact, also, that the securing of a satisfactory trade agreement on hours and wages was, after all, the greatest single obstacle with which the association was confronted within the year just past, and the expenditure of effort in that direction represents the only important item worthy of mention in this report.

None the less true is it, however, that the terms of the agreement under which you are operating your shops at this time are in substantial compliance with those drafted by our hours and wages conference committee and presented for your consideration at the meeting of the association held on Sept. 2, 1910, and thereafter submitted to the San Francisco Industrial Conciliation Board. If, on the other hand, the findings of the Conciliation Board had been made in conformity with those asked of it by the Iron Trades Council of San Francisco, the terms of the proposed agreement that would have been submitted by the Conciliation Board, would have called for "an agreement for at least one year containing the present hours and wages, and providing conditions whereby the men will work in accordance with the constitutional laws of their respective unions."

What the ultimate outcome of the new agreement is to be, is another story, and may be told by Mr. Eva, my worthy successor, in his annual report one year from tonight. Suffice it to say, however, that the tables have been turned and that whereas the work-day was gradually reduced under my administration, by reason of the former agreement, and for a long time it appeared as though the eight-hour day had come to stay, unless successfully combatted, the agreement recently effected assures us, on the paper at least, that on Nov. 9, 1911, and thereafter during the life of said agreement, the work-day of employes in the shops of our members will be equal to the average hours obtaining on Sept. 9, 1911, among men working in the metal industries elsewhere in California, and within the states of Oregon and Washington.

That myth about the old agreement assuring this association something other than an eight-hour day once and for all times seems to have been accepted by some of our members as genuine gospel, despite the fact that

Photo by H. Pierre Smith.

SAM J. EVA

Of United Engineering Works, president of California Metal Trades Association.

in signing the former agreement they thereby placed themselves in the position of abiding by its provisions, and nothing could be worded more plainly than that provision reading—"after June 1, 1910, eight hours shall constitute a day's work."

The Chase Foundry & Mfg. Co., Columbus, O., at its annual meeting of stockholders, Jan. 14, re-elected the retiring board of directors. P. A. Myers, of the firm of F. E. Myers & Bro., Ashland, O., was elected president: Guy C. Myers, also of Ashland, vice president; and S. M. Chase, of Columbus, secretary and general manager. The business for 1910 was found to be most satisfactory, and the outlook for 1911 exceptionally good.

New York Air Brake's Annual Report

The report of the New York Air Brake Co. for the year ending Dec. 31 last, shows the following income account with comparisons:

	1910.	1909.
Sales and other inc.....	$2,690,198	$2,115,115
Admin. exp., tax, cost mfg. and sell.....	2,060,337	1,660,244
Bond interest	181,800	181,800
Depreciation	.....	3,987
Total deduct	2,242,137	1,846,031
Profit for year	448,060	269,084
Dividends	299,772	.....
Surplus	148,288	269,084

President C. A. Starbuck thus commented upon the year's business:

General conditions of business during the last year were a complete reversal of the preceding year. That is, in the year 1909 the profits of the company were made during the last four months, whereas in 1910 the profits were derived largely from the first six months.

The explanation briefly is that at the close of 1909 the indications of business seemed to promise 1910 would be one of the best for railroad equipment companies. These indications bade fair promise of fulfillment until the latter part of May, when the agitation in railroad rates began. If orders had continued to come in as they did up to May, the business for the year would have been most satisfactory, but as the result of this agitation on railroad rates and the continued deference of a decision of that matter, the railroads were compelled to immediately adopt a policy of retrenchment, which resulted in the cancellation or suspension of orders already placed and withholding all contemplated orders.

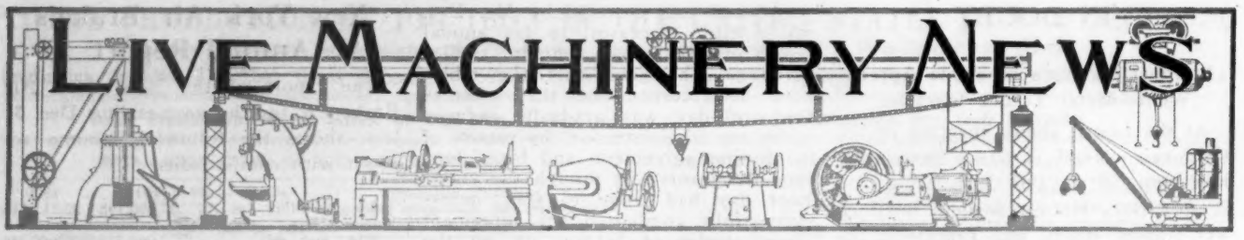
During the last year the company has built and completed on its East plant at Watertown a thoroughly fireproof new machine shop, 200 x 360 feet in size, and added considerable new machinery, which will result in annual saving of a large amount of money.

The company has also made great improvement in its engineering department, has brought out many new devices and taken valuable patents on some in this country and in Europe, and is now in fine physical condition to handle a greatly increased volume of business.

The Massillon Foundry & Machine Co., Massillon, O., advises that its recently noted increase of capital was simply to replenish its working capital, which had been somewhat diminished the past year to provide for new installations of machinery. At present it is not considering further additions to either building or equipment.

The Ralston Steel Car Co., Columbus, O., advises respecting the recently noted increase in its capital stock, that any financial changes which it is making do not anticipate additions or improvements in its property at the present time.

LIVE MACHINERY NEWS



The increasing amount of small business was the feature of the machinery markets last week. In New York the most important event was the appearance of a small list of five machine tools put out by the Delaware & Hudson Railroad Co. This is considered to be preliminary to extensive requirements which will be necessary for the large shops which that railroad is to erect at Watervliet, N. Y. A large electrical manufacturing interest has also been sounding the New York machinery market on equipment for its large plant in Pennsylvania, and much business is expected from this source in the near future. In the Pittsburg district, inquiry for all kinds of machinery is heavier than for some time; an improvement is also noted in the volume of business booked. Pittsburg dealers look forward to the awarding of some large contracts in connection with proposed new work. In Cleveland, a general improvement is reported. A large amount of new construction work, including new works of all kinds, has been planned for that section, and, in several cases, these improvements are already under way. The American Steel & Wire Co., through its Cleveland office, awarded the large list of machinery issued some time ago for its Corey, Ala., plant, to the Dewstoe Machinery Co., Birmingham, Ala. In Milwaukee, there is a better tone to the machinery trade and a number of plants in that vicinity are working overtime. In the Pacific northwest contemplated public improvements will soon call for considerable equipment. Inquiries of sizeable volume for car shop equipment are being submitted by the railroads in that section.

Railroads

The Louisville & Nashville will build track repair shops at Evansville, Ind., at a cost of $140,000, it is reported. The road is now maintaining shops there.

The Northern Pacific railroad will this summer construct a large round house and repair shops at Centralia, Wash. The plans include the general enlargement of the trackage facilities at that place and the entire work will cost over $500,000. The repair shops will be fully equipped with the latest car working machinery.

The Pittsburg & Lake Erie Railroad Co. has prepared plans for the extension of its repair plants along the lines south of Pittsburg. They are intended to take care of the increased repair work, following the building of new lines to connect with the Western Maryland railroad extension at Connellsville, Pa., but authority to begin actual construction has not been given.

The Delaware & Hudson Railroad Co. last week distributed in the New York district a small list of machine tools. This equipment is only a beginning of the extensive requirements which will eventually be purchased for the company's shops at Watervliet, N. Y. The present specifications include five machine tools as follows: One five-inch, semi-universal radial drill; one 16-foot, 10-inch, tool-maker's lathe; one 20-inch, slide-back, gear pillar shaper; one 20-inch, double spindle, bolt threadnig machine and one No. 4 high power milling machine. This company recently applied for permission to issue bonds to cover the cost of the following projects: New shops at Watervliet, N. Y., and coal storage facilities at Carbondale, $1,681,975; new round-house at Carbondale, $200,265; a coal transfer plant at Glenville, $67,400. George H. Burgess, Albany, N. Y., is the chief engineer of the road.

Iron and Steel Works

The Crucible Steel Co. of America, Pittsburg, is making extensive improvements at its Atha plant, Harrison, N. J. A Heroult electric furnace, open-hearth furnaces, a 1,500-ton press and three new cranes will be installed. The trade will be asked to submit bids within the next few months on some of the machinery to be installed at the proposed new works at Midland, Pa.

The Rateau Steam Regenerator Co., 2 Rector street, New York city, has sold to the Illinois Steel Co., for its South Works at South Chicago, five Rateau steam regenerators. These regenerators will handle the exhaust steam of several reversing mill engines, and will deliver a constant supply to two mixed flow turbines; the capacity of the plant being some 6,000 kilowatts.

The Morgan Construction Co., Worcester, Mass., which was given the general contract recently for the erection of the new 16 and 14-inch combination continuous rolling mill of the Republic Iron & Steel Co. at Lansingville, O., has awarded a contract to the United Engineering & Foundry Co., Pittsburg, for the necessary equipment. Preliminary work on the new plant has already been started.

Foundries

The Sanford Foundry & Stove Co., Knoxville, Tenn., is to erect a new plant in the near future.

The Arcade Malleable Iron Co,, Worcester, Mass., is making alterations in its building on Albany street, that city, and will probably use it as a foundry.

The Fairbanks-Morse Co. has taken out permits for a new $13,000 foundry and foundry cleaning and pattern room, at 1363-1369 Bloor street, west, Toronto, Can.

F. S. Harmon, engineer, Northville, Mich., has prepared plans and will superintend the construction of a foundry for the American Bell & Foundry Co., Northville. The building will be of cement construction, 60 x 80 feet.

The Davis-Price Machine Co., New Cumberland, W. Va., has started its new foundry department, which replaces the foundry destroyed by fire some time ago and the new machine shop will be placed in operation in the near future.

The American Brake Shoe & Foundry Co., Chicago, has let to Dodge, Day & Zimmermann, Philadelphia, a general contract for a plant to be erected at the northwest corner of Forty-fourth avenue and Division street, Chicago.

The Taylor & Boggis Foundry Co., which recently sold its property on East Fifty-fifth street, Cleveland, to the Pennsylvania railroad, will soon build another foundry in that city to take the place of the one to be torn down. Although a site has not yet

been selected, it is expected that building operations will begin some time during 1911.

The Buckeye Steel Castings Co., Columbus, O., has purchased 85 acres at Indiana Harbor on which it intends to erect a new plant. Plans have not been completed, but the new plant will include an extensive steel foundry. S. P. Bush, Columbus, O., is president and general manager.

The Brown-Lewis Co., manufacturer of agricultural machinery at Walla Walla, Wash., announces that it will this spring enlarge its plant. The plans include a new foundry building. A large amount of machine tools and equipment will also be required for a new assembling shop.

Charles Wales, formerly with the Wales Adding Machine Co., Wilkes-Barre, Pa., is planning the establishment of an adding machine factory at Nashville, Tenn. He is now organizing a company for that purpose. Southern iron will be used in the manufacture of the machines.

The Chisholm & Moore Mfg. Co., Cleveland, which recently purchased a portion of the plant formerly occupied by the Garry Iron & Steel Co., will fit it up as an addition to its malleable iron foundry. A new 15-ton malleable furnace will be erected and modern sand blast equipment will be installed.

Additions recently completed by the Central Foundry Co., Milwaukee, have doubled the capacity of the plant and give it probably first rank among the jobbing foundries of the city. The company was established only six years ago, and makes a specialty of engine cylinder castings. The daily capacity now is 250 cylinders and the firm has orders on its books for the year's output. John Manning, for many years superintendent of the Wisconsin Engine Co.'s foundry at Corliss, Wis., is in charge of the Central plant and A. E. Martin is general manager. In connection with the Central Foundry Co. is operated the Hoyer Metallic Packing Co., capitalized at $30,000, which removed from Corliss about a year ago. This concern manufactures metallic packing.

New Works

The Battle Creek Engine Co., Battle Creek, Mich., is planning to erect a three-story plant.

The Brake Shoe Co., Moundsville, W. Va., has let contract for the construction of a new factory.

The Haughton Elevator & Machine Co., Toledo, O., is preparing to erect a three-story factory building in that city.

The Bottomley Machine Co., Alliance, O., is planning to build a 36 by 60-foot plant. The site has not yet been located.

The Ramapo Iron Works, Hillburn, N. Y., manufacturer of railway supplies, is planning to erect a new switch shop.

The Christiansen Engineering Co., Milwaukee, Wis., manufacturer of gasoline engines, compressors, etc., is planning to erect a new building.

The Great Lakes Mfg. Co., North Chicago, Ill., manufacturer of hardware specialties, expects to rebuild its plant recently destroyed by fire.

The Remington Typewriter Co. has completed plans for enlarging the plant at Ilion, N. Y. It is understood that construction work will be begun at an early date.

The Alamo Iron Works, San Antonio, Tex., Eugene Holmgreen, secretary-treasurer, is planning to add some new buildings and equip the entire plant with new machinery.

The Western Car & Foundry Co., Chicago, has let a general contract to William P. McEvoy & Co., Chicago, for a car body shop to cost $50,000 to be erected at 136th and Ontario streets.

Reports from Hubbard, O., state that the Youngstown Tile & Steel Roofing Co., now located in Wilson avenue, Youngstown, will erect a new plant at Hubbard, O. The main building will be 200 x 300 feet.

John A. Stein, president of the Grays Harbor Iron Works, Hoquiam, Wash., announces the construction of an extensive addition to the present plant which will require the installation of considerable new machinery.

The Sauer Power Generating Co., which has conducted an experimental plant in Rosetta street, Pittsburg, for the manufacture of adjustable shaft bearings and steam specialties, is considering plans for a new plant in the Pittsburg district.

Sherrill & Smith is the name of a firm which has been organized at Tullahoma, Tenn., for the purpose of manufacturing automobiles. High-wheeled cars and roadsters adapted for use on country roads will be manufactured. The concern is already purchasing machinery.

The Reliance Iron & Engine Co., Racine, Wis., has reincorporated, changing its name to the Sta-Rite Engine Co., and increasing its capital stock to $200,000. The concern is transferring its plant to LaCrosse, Wis., in which city it will locate permanently. A large new plant will soon be erected for it in the latter city.

Plans are being prepared by Theodore W. Peitsch, American building, Baltimore, Md., for the new plant of the American Tobacco Co., which will be erected on Boston street, Baltimore. The plant will cover an area about 300 x 400 feet, and will be used for the manufacture of tin packing cases for the company's products.

The Portland, Ore., Railway, Light & Power Co. has purchased a 10-acre tract upon which it will construct a large car barn and machine shop. The company will begin the construction work early this spring and will soon enter the market for a large amount of machine tools and equipment for the shops, which will be of considerable size.

The Trumbull Electric Mfg. Co., Plainville, Ct., will begin work next month on additions to its present plant at Plainville. The two main buildings will be 40 x 106 feet and 63 x 72 feet, each four stories high, of brick mill construction, and each will contain a four-story elevator tower. A two-story engine room building, 25 x 40 feet, is also included in the plans.

We are advised by the Pioneer Tractor Mfg. Co., Winona, Minn., C. M. Youmans, president, that extensive building operations are under consideration and construction will probably commence this spring. The plant to be erected will consist of a machine shop, power plant and testing shop, all of which will be equipped with modern machine tools and appliances. The machine shop will probably be 100 x 600 feet in size.

Public Works

Dayton, Ky., is considering the establishment of water works.

Maysville, Tenn., has decided to construct a water works plant.

Maryville, Tenn., will purchase equipment for a water works system.

The city council at Alameda, Cal., is considering the construction of a new power station.

Clarksville, Tenn., will spend $50,000 in the reconstruction of its water works plant. James N. Hazlehurst, Atlanta, will supervise the work.

The Chilhowee Water Co. has been incorporated at Chilhowee, Tenn., with $10,000 capital stock for the purpose of establishing a water system.

Iowa City, Ia., is contemplating the installation of another boiler and a dynamo at the municipal water plant for the purpose of doing its own street lighting.

The commissioners of Marion county, Indianapolis, Ind., will soon ask for bids for the installation of a new passenger elevator in the court house at Indianapolis.

Plans are being considered at Johnson City, Tenn., for a water works

system to cost $500,000. T. Chalkley Hatton, Wilmington, Del., will probably be the consulting engineer.

The city council of Centralia, Wash., has authorized the construction of a municipal power plant and water system to cost $200,000 and will next month enter the market for the necessary equipment.

Milwaukee has made provision for a $300,000 bond issue. This sum forms the original appropriation for the new municipal electric light and power plant. Harry E. Briggs is the commissioner of public works.

Springfield, O., is considering the purchase of a new 15,000,000-gallon pump for its new pumping station, as well as making other improvements to the water works plant at Madison. Wis. A tendent of water works.

Burgess Robert M. Sample, of Springdale, Pa., is arranging for a special election to vote on a proposition to increase the indebtedness of the borough by $50,000, to cover the cost of erecting a municipal water plant for that borough.

The city of Scott, Kas., is advertising for an electric light and power plant. The city is surrounded by a large area of shallow water lands which it is proposed to drain with electric pumps. It is announced that a liberal franchise will be granted to persons who will erect and operate a plant.

The Fred M. Prescott Steam Pump Co., Milwaukee, has received contract for furnishing and instaling two large horizontal pumps in the municipal water-works plant at Madison, Wis. A 3,000,000-gallon pump will be installed in February and the other, a 1,500,000-gallon pump, in March. J. F. Icke is city engineer.

The board of public works of Seattle, Wash., has passed favorably upon the project of building a 2,000-horsepower hydro-electric plant on Lake Union, utilizing the waste water system. A large reservoir will be constructed of concrete reinforced material and several tons of steel pipe will be bought to carry the water to the plant.

A hitch has occurred in the plans of the city of Muskegon, Mich., for a new municipal lighting plant. A bond issue of $75,000 has been authorized for this work and F. F. Van Tuyl, consulting engineer, Detroit, Mich., has been retained to prepare plans, but certain tax-payers have secured a temporary injunction restricting the city from spending any money for the construction of a new lighting plant and until a decision is definitely reached regarding this matter it will be impossible to state just when any work will be done. It is anticipated, however, that a definite decision will be rendered by the court about Feb. 10.

Power Plant Equipment

The Jackson, Tenn., Veneer Co. will purchase new power equipment as the result of the bursting of a flywheel in its engine room.

A. P. White & Co. will be in the market for an electric motor and other equipment to be used in the operation of a 50,000-bushel grain elevator at Cadiz, Ky.

It is reported that Joseph F. Sturdy, 287 Michigan avenue, is contemplating the installation of a 75-kilowatt generator and engine in his plant at 57 West Thirty-fourth street, Chicago.

The Cedar Rapids & Iowa City Railway & Light Co., Iowa City, Ia., is reported to be planning the erection of two new power houses to be located at Iowa City and North Liberty, Ia.

Electric machinery for operating a tramway in a new mine will be purchased by the Stearns Coal & Lumber Co., Stearns, Ky., of which Justus Stearns, Ludington, Mich., is president.

The Wheeling Electric Co., which was given permission by the city council of Wheeling, W. Va., recently to erect and maintain a pumping station along the river bank in that city, is preparing plans for the new plant.

The Thousand Springs Power Co., Mountain Home, Id., is considering the construction of a power plant, of a five-mile transmission line and of a pumping plant. Address Dr. R. G. Roberts, Mountain Home.

The Merchants' Power & Light Co., Baraboo, Wis., has been organized for the purpose of erecting a power plant in that city. James Dickie, George McArthur Sr., and George McArthur Jr., all of Baraboo, are interested.

The Chicago & North Western Railroad Co. will install a complete electric lighting plant in its headquarters at Baraboo, Wis., according to report, to light its shops; roundhouses, yards, station, freight depot and other buildings.

Hunt-Helm-Ferris & Co., Harvard, Ill., C. E. Hunt, president, will construct a brick addition to their plant, 136 x 95 feet, three stories high, this spring and will be in the market for electic motors and elevator machinery.

The Kentucky Electric Co., Louisville, Ky., which is to erect a large new light, power and heating plant, is now having plans drawn for the plant, and will be able to announce details concerning the equipment after Feb. 6.

The Gulf, Colorado & Santa Fe railroad, besides appropriating $42,000 for additional machinery for its shops at Temple, Tex., will install a steam heating plant in that city and is also considering the erection of an electric light and power plant.

Plans are being perfected for rebuilding the power station of the Minneapolis General Electric Co., Minneapolis, Minn., recently destroyed by fire. The new station will cost at least $750,000, and will require a large amount of machinery. Definite plans have not yet been formulated.

The Titusville, Pa., Iron Works, through its Pittsburg office, has booked the following orders for boilers: Margaretta school, Pittsburg, one 100-horsepower; the Darlington Brick Co., Darlington, Pa., two 200-horsepower, and the Portsmouth, O., high school two 125-horsepower.

J. H. Gibson, who with associates recently purchased the property of the Somerset, Ky., Water, Light & Traction Co., has announced that the improvements to be made will include the installation of new machinery in the power house of the street railway system and the purchase of new engines and other power equipment for the water works.

Daniel W. Mead, consulting engineer, Madison, Wis., advises that he is preparing plans for a hydro-electric plant which it is proposed to construct on the Menominee river near Iron Mountain, Mich. While the plans have not yet been fully completed it is probable that the initial installment will comprise three 1,000-kilowatt generators, direct-connected to twin turbine units operating under a normal head of 40 feet.

The Westinghouse Electric & Mfg. Co. has recently closed a contract with the Universal Portland Cement Co. for motors to operate the No. 6 plant of the latter at Buffington, Ind. The motors will be of the "MS" mill type, suitable for cement mill work, and they will operate on a three-phase, 25-cycle, 440-volt circuit. The sizes range from 5 horsepower to 200 horsepower, and the aggregate capacity is 11,500 horsepower.

The Kentucky Securities Co. has been chartered at Richmond, Va., with $5,000,000 capital stock for the purpose of taking over the Lexington & Interurban Railways Co., which controls the street railway systems of Lexington and Frankfort, Ky., and interurban lines over central Kentucky. The refinancing plans are the result of a decision to install a new power house for the railway systems and reconstruct the plant of the Lexington Electric Light Co., which the new corporation will control. Percy M. Chandler, Philadelphia, is president of the Kentucky Securities Co.

THE ABC OF IRON AND STEEL

Beneficiating Iron Ores

By John Birkinbine

BENEFICIATION is a term which may be applied to the improvement of ores for enriching their metallic contents, or for eliminating or reducing inert or objectionable components. While the term is used more generally for precious metals than for iron ore, it is employed in this article to include the various methods by which mineral containing iron can be improved in quality, and some which in its native state is undesirable, converted into merchantable product.

The processes of beneficiating iron ores may be grouped as follows:

Roasting, to drive off moisture or carbonic acid from hematite and carbonate ores, or as is the case with the magnetite from the Cornwall Ore Hills of Pennsylvania, and many New Jersey mines, to reduce the amount of sulphur. Roasting is also used to improve the physical structure of dense ores or to facilitate the removal of clay or sand. Various methods of roasting in open piles, in kilns by the use of solid fuel, gas or oil, or in specially constructed furnaces with mechanical movements are described later.

Washing is employed with ores which are closely associated physically with excessive amounts of clay or sand and is used in many mines producing brown hematite or limonite ores. Jigs in which separation is made in water is also a modification of washing.

Magnetic concentration consists in passing ore over magnetic separators, and is confined to the use of magnetites, as in the Lake Champlain district, New York, or of hematites or of blast furnace flue dust, which have been made magnetic by heat. The process consists of separating the more highly magnetic particles from those which are feebly magnetic or non-magnetic.

Briquetting is auxiliary to methods of beneficiation where the material is comminuted or finely ground, and consists of merely converting this material into a form convenient for handling and use.

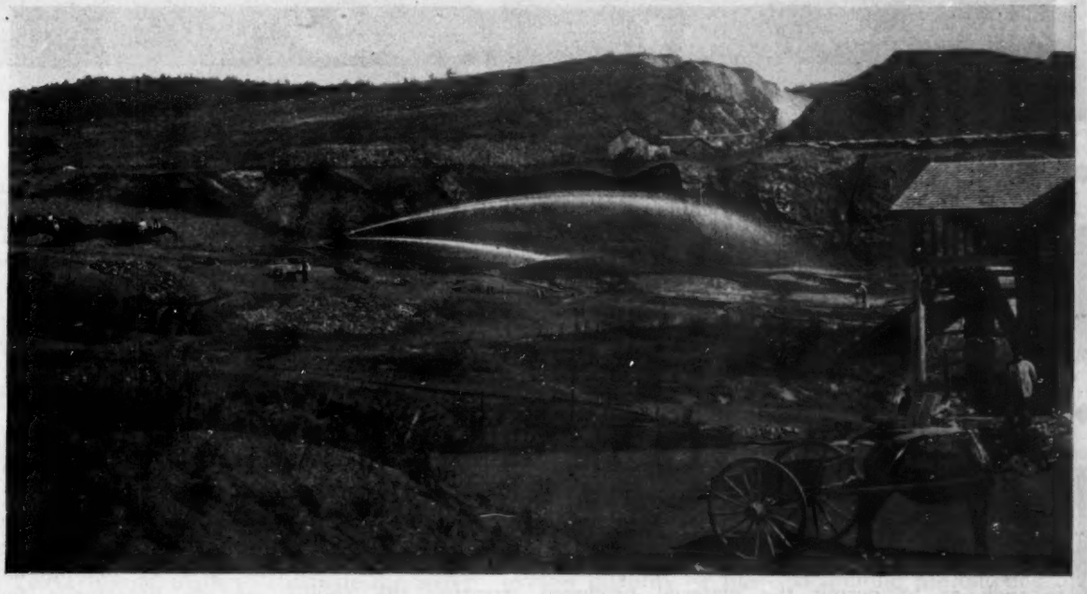


FIG. 1—METHOD OF WASHING AWAY THE CLAY OR LIGHTER MATERIAL FROM THE IRON ORE. TWO HYDRAULIC GIANTS ARE SHOWN IN ACTION

Roasting, washing and magnetic separation have long been practiced, and briquetting of fuel has been before the business world for half a century. In all of these, there have been failures and successes; the former, more widely known because of the tendency to remember them, and the latter seldom advertised, by reason of the fact that the parties who have been successful prefer to have for their own advantage the results of the money expended in experimenting.

Beneficiation of iron ores has been carried further in Europe than in this country, because the abundance of rich or satisfactory iron ores in the United States has encouraged their use in preference to treating mineral which required improvement. However, the iron ores competing at a given point with iron ores as shipped from the mines, or when the economical operation of blast furnaces more than offsets the expense of ore preparation, beneficiation may well receive careful attention.

The equipment used in the different processes is the result of careful study, many improvements resulting from continued experimentation, and the crushers, rolls, screens, jigs, separators, carriers and roasting furnaces of various types are greatly in advance of those formerly used. Studies of the physical structure and chemical composition of iron ores, their fluxing and action in the blast furnace, have also been thoroughly investigated.

From the above it appears that the treatment, if any, which an iron ore should receive, must

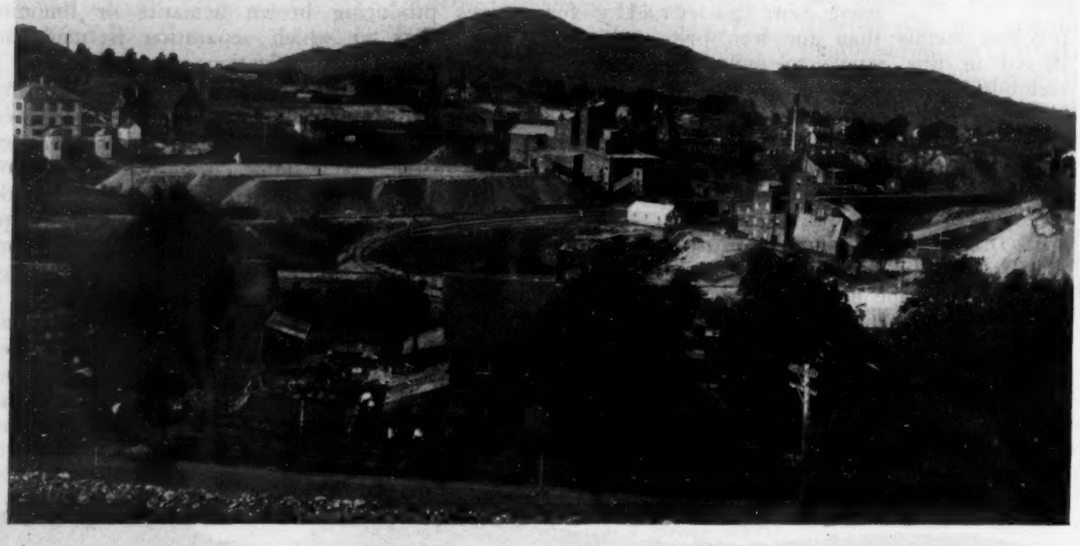


FIG. 2—VIEW OF MINEVILLE, N. Y., SHOWING LARGE IRON ORE CONCENTRATING INSTALLATIONS. MILLS NOS. 1 AND 2 ARE SHOWN AT THE RIGHT

fed to the blast furnaces of the United States require, on the average, the smelting of nearly two tons of ore to produce one ton of metal, and as fuel economy is the important factor of successful blast furnace operation, it is believed that beneficiation of iron ores will receive more attention than heretofore, and that some known deposits which are not used, or if formerly used are now dormant, will become active producers of ore, that after treatment, will be in demand as material from which to obtain iron.

All of the processes indicated demand expenditure for plant and operation to convert the output of the mines into material of such character and form as will make it a marketable product; but when the cost of preparation is such as to permit the material produced be determined after study of the physical character and chemical constituents of each individual deposit in connection with its size and location as a source of supply to blast furnaces, and also as to the character of metal to be produced.

Complete recovery of the iron contents of an iron ore is not secured in any process of beneficiation, some of the metal passing off as waste or tailings, although in many instances a portion of this waste may be recovered by subsequent treatment. As the loss of metallic iron directly influences the quantity of ore handled to produce a given tonnage of beneficiated ore, the merit of any process must be considered in connection with the cost of mining and treating the volume of ore necessarily fed.

Thus, if an ore containing 38 per cent of iron is beneficiated so as to supply a product containing 60 per cent of metal, the waste or tailings carrying off 16 per cent of iron, two tons of crude ore must be treated to obtain one ton of beneficiated ore, but if the loss does not exceed 8 per cent, less than 1¾ tons of crude ore will be required. The additional expense incurred may or may not warrant the saving of that which, otherwise, would be waste if it is necessary to reduce the mineral to small size.

In many cases it may be inadvisable to beneficiate to the apparent practical limit, but to produce partially enriched or improved ore at less cost. Thus, a 38 per cent iron ore raised to 56 per cent of metal, by the loss of 16 per cent, will require the treatment of 1.82 tons, or by the loss of 8 per cent—1.6 tons.

The character and composition of ore fed to blast furnaces influence the amounts of flux and fuel used, the labor required, the interest and depreciation on cost of plant, and other items which are subject to the tonnage as a divisor. Consequently, the possibility of improving any iron ore before charging to blast furnaces is worthy of careful investigation.

The transportation of iron ore is rated by the ton, the freight upon a rich ore being the same as for a lean ore for a given distance; consequently, the presence of non-metallic particles in an iron ore increase the transit charges upon the metallic portion. Thus extended experiments, made to eliminate the water from some Lake Superior iron ores, had the purpose in view of lowering the freight charge per unit of metallic contents. Some limonites in use carry one part of water to three parts of metallic iron, and other ores now smelted have about as much non-metallic as metallic contents; hence, the freight charge upon the unproductive portion limits the use of such ores to blast furnaces nearby. Conditions such as these affect many of the southern ores, but some have the advantage of the gangue material possessing fluxing qualities, and the phenomenal iron and steel industry of Alabama has been developed from the use of iron ores which could not be advantageously transported to distant points, or economically smelted with fuel which demanded high freight charges.

As excessive proportions of gangue material must be removed by fluxing in the blast furnace, the lime supplied for this demands that additional fuel be burned, and where the gangue material can be lessened by a process of beneficiation, economy of fuel and labor at the blast furnace may result.

Where iron ores are improved by the reduction or elimination of elements which affect the smelting process or the character of the metal produced, the advantage of beneficiation is more in securing a desirable product than in reducing transportation costs. However, elements like sulphur must be neutralized by lime, which augments the amount of cinder or slag produced, demanding the consumption of a greater quantity of fuel and limiting the output of the furnace. The following outline of vari-

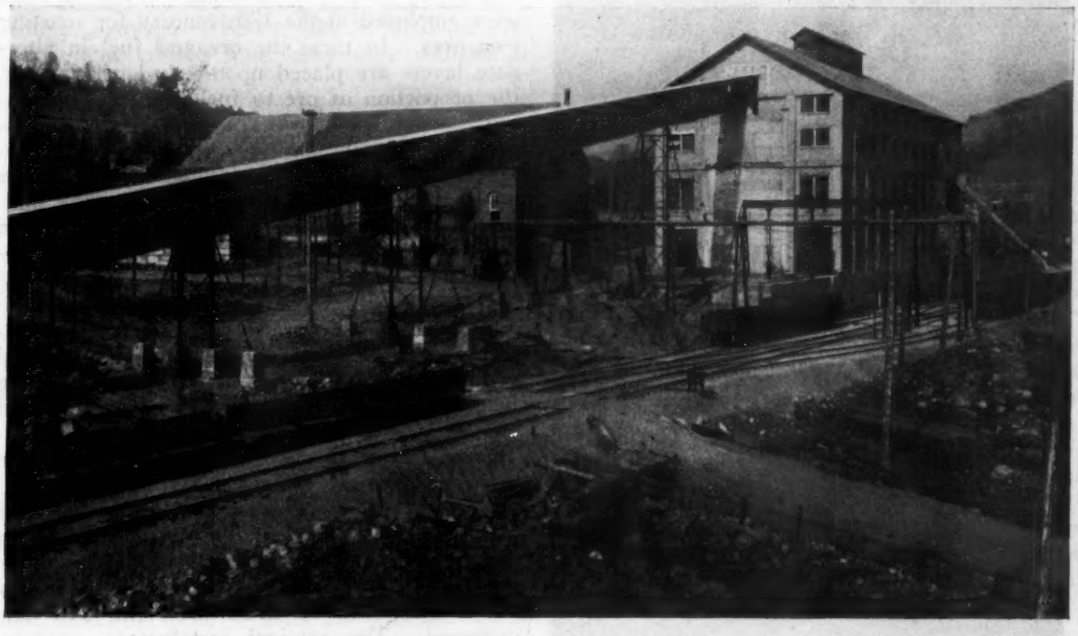


FIG. 3—IRON ORE CONCENTRATING MILL NO. 3 AT MINEVILLE, N. Y.

ous methods for beneficiating iron ores must necessarily be limited to the prominent features.

Hand-Picking Ores.

Probably the earliest attempt to enrich ores was by hand-picking or cobbing the visibly lean or unproductive material from that which was apparently richer. Later, belts passing before the laborers or shaking tables facilitated such separation. The dump piles of some of the older mines contained so much of value that they have been worked over, and at one important mine in the Marquette range of Michigan such recovery was at the rate of five tons of merchantable ore for each seven tons of material handled, the cost being 38 cents per ton of ore saved. In the Lake Champlain district of New York, some waste piles from the earlier mine operations are reworked, the best of the mineral crushed, and passed over magnetic separators.

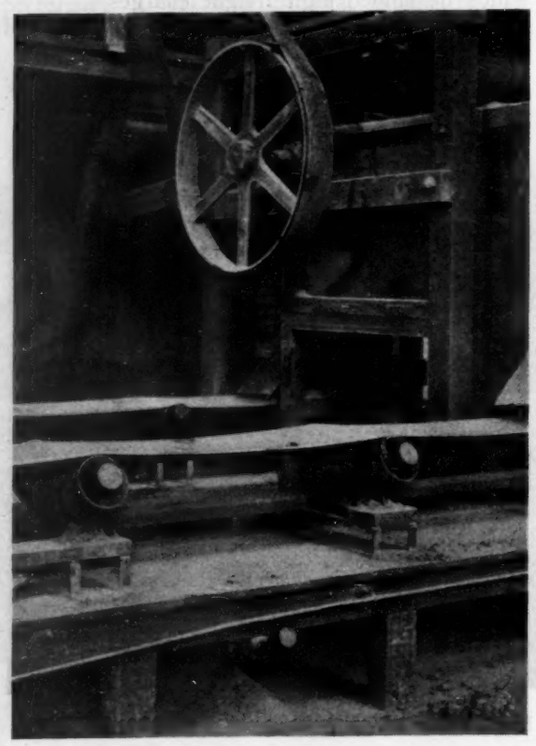


Fig. 4—Separator, Showing Belt Conveyors to Transport the Concentrates and Tailings

At some mines hydraulic giants, large nozzles from which volumes of water are ejected at high velocity, wash away the clay or lighter material from the ore in *situ* or from waste piles, thus performing a preliminary cobbing. A view of two giants in action is given in Fig. 1.

Large expenditures have been made to beneficiate by washing some of the leaner, sandy ores exploited in Minnesota, and also to improve the mineral won from a large deposit in Cuba and shipped to the United States. The latter, which occurs finely divided in a clayey matrix and carries water in large amount, must be dried and agglomerated to facilitate transportation and handling.

Roasting Ores.

Roasting was originally employed to aid in breaking lumps of iron ore, caking clay, or drying associated sand, which was removed by screening, also to drive off carbonic acid gas in carbonate ores, to partially remove sulphur from ores carrying this in large percentages, and to evaporate moisture, all of which interfere with economic smelting.

Records show that open piles, heaps or ricks were employed in the 17th century for roasting iron ores. In these the ore and fuel in alternate layers are placed upon a bed of kindling, the proportion of ore to fuel generally increasing towards the top of the pile. Ores containing carbonaceous matter, sulphur or other combustible components are treated in long heaps of limited width and height, wherein the minerals do not attain as high temperature as in larger heaps, and the ore is less liable to become fused.

Roasting between parallel walls is merely confining open piles or ricks within defined boundaries, and in some cases, pile roasting is carried on under cover. The disadvantages of roasting in piles are comparatively large consumption of fuel per ton treated and the difficulty in regulating the temperature throughout the mass, when exposed to wind or rain.

Economies in fuel, labor and in handling ores encouraged the construction of masonry kilns as improvements upon pile roasting, ore and fuel being fed at the top, generally in layers, the roasted ore removed from the base and screened. The original installations, modeled after lime kilns, were improved by erecting masonry cylinders upon piers or metal columns which support mantel rings. The cylinders were of brick, held by iron bands, or riveted shells, lined with brick and are known as Gjers kilns. In size they vary from 10 to 22 feet maximum diameter, and in height from 12 to 20 feet, and some are provided with hoods and chimneys for withdrawing the vapors. The amount of fuel consumed (coal or coke braize) varies from 50 to 100 pounds per ton, and the cost per ton of roasted ore approximates 30 cents (18 cents for fuel and 12 cents for labor), the ore being under treatment from two to ten days.

Cost of Roasting.

In roasting 64,000 tons of ore at one battery of kilns in a year, the cost for labor, fuel, re-

pairs and supplies averaged 19.7 cents per ton. The Cornwall ore treated contained approximately 42 per cent of iron, 2.5 per cent of sulphur and 0.6 per cent of copper, the sulphur being reduced to about 1 per cent, as this was the primary object of the roasting.

The largest Gjers kilns were constructed in eastern New York to drive off carbonic acid and water from carbonate ores. The wrought iron shells are 24 feet in diameter and the kilns 60 feet high. The shell, resting on a cast iron mantel, was supported on cast iron columns, 10 feet 3 inches high. The space within the columns was built of masonry to form a cone which was covered by cast iron plates connecting with chutes. The shell was lined with fire brick to the diameter of 21 feet. Mine cars discharged into the top of the kilns, reducing the amount of labor, and fuel was fed in a similar manner. At some places, old blast furnaces and unused lime kilns were utilized as roasting kilns.

Grittinger Kiln.

A modification of the Gjers kiln is the Grittinger, in which a series of column brackets support a mantel, carrying the iron shell of the kiln and its lining, and to these brackets the ore chutes and inclined bottom plates are secured. The base of the kiln is a star-shaped cone, the points of which abut against column brackets, forming chutes to encourage a regular distribution of the roasted ore. A large flue within the star cone supplies air for combustion in the center of the kiln. The development of kilns for roasting iron ores has been most pronounced in the Cornwall district (Pennsylvania) and in New Jersey, where two-thirds of the sulphurous iron ores utilized in the United States are produced.

Kilns in which solid fuel is employed remove about one-half of the sulphur from iron ores, but somewhat better results are obtained where gas is used. In all kilns, lumps of large size are objectionable, and limited amounts of fine ore, when used, should be thoroughly mixed with the coarse.

The initial gas-fired roasting kiln, the Westman, was constructed in Sweden, but in the United States modified forms have been used, all embodying a series of vertical or inclined chambers of relatively small area about a central core.

The Taylor kiln is circular in shape, with a central combustion chamber, surrounded by a series of vertical ore chambers arranged to enable gas burning in the center, passing into the ore chamber. A kiln 15 feet outside diameter and 36 feet high roasting dense New Jersey magnetites gave a product with from 0.3 to 0.4 per cent of sulphur.

A later modification, the Davis-Colby kiln, consists of two concentric cylindrical shafts of brickwork, 18 to 24 inches apart, divided into sections by vertical walls. The inner shaft forms the draft stack or chimney. Gas enters the gas flues in the outer wall, is distributed to fire arches, where it is ignited, the flames and heat impinging on the ore as it ascends, raising it to the desired temperature. Air admitted at various points and passing through the ore enters the chimney along with the products of combustion. The ore is charged at the top, descends through the annular sections, where it is roasted, partially oxidized and finally discharged near the bottom. In kilns of this type the Cornwall ore, mentioned above, has been reduced to 0.7 per cent sulphur. An improved form is a rectangular masonry structure having two lines of ore chambers, the ore being distributed by means of mechanical carriers, and the superstructure sufficiently elevated to permit the roasted ore to drop by gravity into railroad cars on surface tracks. In a year's operation of a battery of gas-fired kilns, 139,000 tons of ore were roasted, at a cost for labor, repairs and supplies of 9.5 cents per ton; the fuel used was blast furnace gas.

In the kilns mentioned, lump or moderately coarse ore can be roasted, and a limited quantity of fine ore used, but in the methods which are hereinafter referred to, it is essential that the ore be reduced to small sizes, and in some cases ground to powder.

When an ore is comminuted, the mesh to which it is crushed is recognized as the size of the openings in screens through which it will pass; thus, it is understood that 1 mesh, 8 mesh, 10 mesh, 12 mesh, 20 mesh, etc., indicate that they are the respective numbers of openings in 1 inch of screen surface, irrespective of the size of the wire used; that is, in one square inch of 10 mesh screen, there should be 100 openings, each slightly under one-tenth of an inch square.

Nodulizing Iron Ore.

Nodulizing is a method of agglomerating fine ore or concentrates in inclined iron cylinders, 7 to 8 feet in diameter and 80 to 100 feet long, lined with fire brick. These cylindrical kilns revolve on rollers at from one to two revolutions per minute. The concentrates or fine ores, charged at the high end, are gradually heated and then cintered, forming firm and porous nodules, which vary from about 3-inch size down to 12 mesh, 80 per cent of the product being larger than ¼ inch. Fuel fed at the lower end of the cylinder may be either coal, finely pulverized, coke oven, producer or blast furnace gas, or tar. Coal must be dried before it is ground, and the proportion of volatile matter should be 25 per cent or more. The higher temperature, 1,300 to 1,400 degrees Cent., is maintained about 15 feet from the hot

end, and at this point scaffolds or rings are apt to form.

The kilns have a capacity of about 100 tons each per day, and every 10 days it is necessary to cool a kiln to remove the ring deposits of cintered ore. At Lebanon, Pa., a plant of four nodulizing kilns treat Cornwall ore which has passed through magnetic separators, the purpose being to desulphurize and also to nodulize the ore. The product has been smelted satisfactorily in blast furnaces, the entire charge for a time being nodules. These kilns reduced the sulphur to from 0.03 to 0.05 per cent. In Northern New York, one plant is operated with blast furnace gas and another with producer gas.

While the perfection of desulphurizing is undoubtedly due to treating finely comminuted ore, which, while incandescent, meets air currents, it would seem that ore broken to moderate but nearly uniform size could be desulphurized in these rotary kilns.

Cintering Furnaces.

In *cintering furnaces,* the ore used is mixed with fine coal or coke braize, is fed on a movable bed of satisfactory depth, and at such speed as will give the best results for the ore undergoing treatment. This bed is made to pass under a flame of producer or blast furnace gas, which, igniting the fuel in the mass, raises the same to such a temperature that it cinters into a slab, and drives off most of the sulphur. This slab is then carried beyond the furnace and broken off into sections, which can be easily handled. In one form of cintering furnace, the products of combustion pass along with the bed of ore to a draft stack. In another, the bed is perforated and as it passes over an exhaust box, the heat and flame are drawn through the ore. These furnaces, however, have not yet sufficiently demonstrated what they can do with iron ore, although it is claimed that blast furnace flue dust has been successfully cintered.

In roasting ores of other metals than iron, a variety of furnaces have been and are used, and a plant is now being installed to treat sulphurous magnetites which, after grinding, are fed upon shelves, and as the ore is heated, revolving scrapers remove it from one series of shelves to others below.

Briquetting Iron Ore.

Fine ore, either occurring in a natural state or produced by comminution, is objectionable in the blast furnace, as owing to its physical condition a considerable amount is blown out by the air pressure and carried over as flue dust. It is also apt to cause slips in the furnace, and when accompanied with fine coke, explosions may follow.

In order to obviate these troubles, many methods have been tried to agglomerate the fine particles, one of these being briquetting. An ideal briquette should withstand the influence of steam, water and heat, for a considerable time without crumbling, be able to resist pressure, have a certain amount of porosity, the binding material, if one is used, should not contain noxious substances, and the cost of manufacture should not be too great.

Briquettes are of two classes, one being made by pressure, with or without heat, and the other employing a binder or cementing material. The binders which have been tried include lime, gypsum, tar, aluminous ores, cement, cinder, etc., but in this country the commercial manufacture of briquettes has been less satisfactory than in Europe, where a lower wage rate prevails. It is questionable whether as satisfactory or economical a product will result from briquetting as from nodulizing or cintering.

The processes herein described all require heat in treating the ore, and in some of them, it is essential that the material should be broken to small size. Those next discussed demand the use of water.

Washing Iron Ore.

In mining brown hematite or limonite ore, sand, clay, ochre, gravel, etc., is dug with the ore, which is usually removed by shaft or cone *washers,* often from three to four tons of material being handled to obtain a ton of merchantable ore.

The earliest type of shaft washer consisted of a log, 16 to 30 feet long, fitted with blades revolving in an inclined trough, into which the ore is dumped and streams of water added. As the log revolves, the blades cut the clay lumps and force the sand, gravel and the ore up the incline of the trough to a discharge opening, the water carrying away the clay. This style of washer, sometimes known as a *buddle,* was improved by using two parallel logs in one trough, and later, iron shafts replaced the logs.

An improved washer has two hexagonal or octagonal metal shafts, about 30 feet long and 18 inches in diameter, fitted with detachable chilled blades or teeth, and placed in an inclined trough, so as to practically submerge the shafts for one-half of their length. The shafts are revolved by gear wheels, operated by an engine or motor, and from the trough the ore falls into a revolving screen, where a final rinsing takes place, and the finer ore or sand is separated from the coarse ore, the latter being fed to a table or belt, from which the lean material may be hand-picked.

Cone washers are also used. They consist of a series of perforated iron staves, secured to spiders, forming a cylinder with conical end, which is revolved by gearing, and into which

the ore is fed with a stream of water. The staves have on their inner faces series of blades or cutters, which break up the clay lumps, the water carrying this off, and the fine ore passes into a revolving screen, which saves all the ore above a determined size.

Magnetic Concentration.

Magnetic concentration consists in separating by magnetic force fine particles of magnetite from gangue materials, which have been comminuted to the desired size, three general classes of separators being used, as follows:

1.—Those on which the ore is fed on traveling belts, either traversing magnets or traversed by them.

2.—Those in which the ore is fed upon revolving drums, within which are arranged a system of magnets.

3.—Those in which the ore is allowed to fall in a thin stream before magnets which alter the trajectory of the descending magnetic particles.

Magnetic concentration may also be subdivided into dry and wet separation, the crude ore being treated dry or in the presence of water.

The most prominent dry concentrating plant is that of Witherbee, Sherman & Co., at Mineville, New York, where there are three mills to treat the ores coming from the different mines. The processes may be briefly outlined as follows:

To No. 1 mill is fed crude ore from the Harmony mine, also tailings from a cobbing plant. This cobbing plant breaks the ore to 1½-inch size and passes it over a single drum magnetic separator to produce cobbed ore for shipment to blast furnaces, the tailings going to the mill where, with other ore, they are crushed to ¾-inch size, the fines being dried in a vertical brick stack, fitted with cast iron tee bars, arranged in alternately staggered sections in a furnace. After passing over a magnetic cobber, the heads are ready for shipment, and the tails are reground to ⅜ inch in rolls and passed over belt separators, the tails from these being again separated with a stronger electric current. The final tailings are used in the manufacture of concrete blocks. The crude Harmony ore contains about 50 per cent of iron, the concentrates 63 per cent, and the tailings 14 per cent.

No. 2 mill treats Old Bed ores, in which phosphorus from 1.2 to 1.5 per cent occurs as apatite or phosphate of lime. The ore crushed to pass 6-mesh screen, is dried and divided in a tower screen into 30, 16, 10 and 6 mesh, each size being fed to belt separators. The concentrates go direct to the shipping bins and the tailings, after further grinding, are retreated by magnetic separators, which make three products: The first, iron concentrates; second, hornblende and some magnetic particles, and third, apatite concentrates and tailings. The crude Old Bed ore mined contains 60 per cent of iron with 1.2 to 1.5 per cent of phosphorus; and the concentrated has 65.84 per cent of iron with 0.72 per cent phosphorus. The process is for purification rather than for enrichment. Some of the Old Bed and Harmony concentrates are re-concentrated, producing ore carrying 70 to 71 per cent of iron.

No. 3 Mill.

No. 3 mill is arranged to receive ore from three mimes, and is constructed throughout so that the various parts are duplicated. The crude ore is brought from the crushers at the mines by means of belt conveyors to a large bin with shaking feed which supplies ore to the secondary crushers, and is elevated to a dividing bin which permits the ore to be fed to either side of the mill. The ore flows to screens with 2-inch holes, the coarser being returned to the crusher and the fines fed to the bins, and from these to the magnetic cobbers, which pick out the richer part of the ore as finished product, the tails passing by conveyors to rolls breaking down to 1 inch, the fines going to a dividing bin, and the refusals to other rolls, where it is further reduced, and passing over separators three products, heads, middlings and tailings are produced. This process is repeated in subsequent operations, the richer portion being taken to bins and only the refusals crushed fine.

These mills produce two grades of phosphate tailings containing respectively 7 and 9 per cent of phosphorus, which are used in blast furnaces in making pig iron, and another grade sold for fertilizer carrying 15 to 18 per cent of phosphoric acid and 30 to 35 per cent of lime.

As the plant at Mineville is the largest dry concentrating installation representing the latest practice, it has been described in some detail, although no attempt is made to cover all the features. At other mines and at some blast furnaces, concentrating plants are in regular operation, but the magnitude of the Mineville equipment has encouraged the presentation of the following illustrations:

Fig. 2 is a view of Mineville, New York, showing at the right mills Nos. 1 and 2, with the tailings, dumps, etc. Fig. 3 shows No. 3 mill, which is made of concrete from the mill tailings and Portland cement. Fig. 4 illustrates a Ball & Norton separator, with belt conveyors to transport the concentrates and tailings.

Wet Separation for Treating Sulphurous Magnetite.

At Lebanon, Pa., the wet separation plan is employed to treat sulphurous magnetite from the Cornwall Ore Hills. The ore is fed from drop bottom cars to a crusher, from which it

goes to rolls, reducing the ore to ¾-inch size. It is then taken on a belt conveyor to a storage bin, from which it is fed with water to a battery of five Ball mills, and one Chile mill. The ore being thoroughly pulverized passes from these mills to Grondal magnetic separators, the finely divided magnetites being lifted from the water and the tailings passing off as sludge, while the magnetic pulp is deposited in settling tanks, from which, when partially dried, it is delivered to the four nodulizing kilns, which are described in an earlier section of this article.

As the sludge from tailings contains copper, which in the crude ore ranges from 0.3 to 0.8 per cent, this is treated upon a Whiffly table and Frue Vanner, which separates the copper and iron pyrites from the balance of the gangue material.

The crude Cornwall ore, which, as stated before, analyzes 42 per cent iron and 2.5 per cent of sulphur, is concentrated to 62 per cent iron with about 1 per cent sulphur, the loss in tailings approximates 20 per cent of iron.

In the above sketch, prominent types only are indicated, for although there is a large number of magnetic separators, few of these have demonstrated their efficiency in concentrating iron ores. Most of those approved submit the mineral to magnets of alternating polarity, which cause the particles to reverse their position while passing from the influence of one pole to that of another, thereby aiding in freeing the magnetic from the non-magnetic particles.

The degree of comminution to which ores are reduced for magnetic concentration is influenced by the texture of the mineral, for unless the grains of magnetite are freed from the enclosing gangue, thorough separation is impossible, and in practice this is seldom achieved.

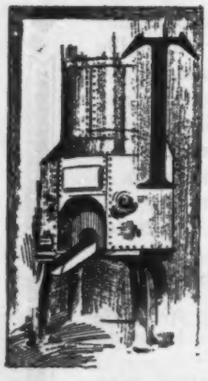
As previously stated, it may be found advantageous to save expense of fine crushing or grinding and subsequent nodulizing or cintering, by feeding moderately coarse material to the magnetic separators, producing concentrates with lower percentages of iron, but in more desirable form for use in the blast furnace. Except as enrichers for other ores of low iron contents, there is little, if any, advantage in charging into a blast furnace ore which yields over 60 per cent metallic iron, for sufficient cinder-making material is essential to economical and satisfactory smelting.

Iron ores are seldom found practically pure as oxides, but are associated with other elements or compounds, or they may be lean and of little commercial value as mined. If the elements or compounds mixed with the iron oxide are not harmful in the further treatment of the ore, and if the mineral is sufficiently high in iron, no beneficiation is necessary other than hand-picking.

When, however, the iron ore occurs as a carbonate ore, or sulphides, or contains in excess sulphur, phosphorus, titanium, silica, etc., or when the ore is so lean in metallic iron as to make it undesirable, various methods of improving it demand careful consideration.

Two Continuous Cupola Melting Records

*By Edgar Allen Custer, Jr.**



THE prevailing impression among foundrymen is that the continuous operation of a cupola of small diameter should be counted among the impossibilities of foundry practice. Some time ago we had occasion to seek information relative to the continuous operation of a small cupola which was run on four-hour heats and which we desired to operate a full day. We were invariably informed that it could not be done and therefore concluded to experiment and thus ascertain, by actual experience, the possibilities of continuous operation with a small furnace. The cupola with which the experiments were conducted is 36 inches in diameter and is lined down to 21 inches with a double thickness of 6-inch circle and 1¼-inch split bricks. It is provided with the regular equipment of two rows of tuyeres and a metal and slag spout. Previous to this time we had been melting about one ton of iron per hour during the morning and taking what iron was needed in the afternoon from the larger cupolas, but a change in the grade of iron necessitated either a continuous run on the small cupola or a corresponding change on the larger cupolas, which was impracticable for our other departments.

Starting in July a number of runs were made—one each day—extending over a period of several weeks, during which every possible form of charging, slagging, and wind pressure was tried and experimented with.

Our first obstacle to overcome was a tendency to bridge, or, expressed more explicitly, a daily formation of an absolutely solid bridge just above the pocket where the melting line should be. At first we regularly tapped out at 7 a. m. and just as regularly were obliged to drop bottom at about one o'clock and we spent most of the afternoon and night chipping and cutting our solid formations in the cupola.

After several trials with patent fluxes, etc., we solved our problem by using a slight excess of limestone and

*Tacony Iron Co., Tacony, Philadelphia, Pa.

a change in our charging ratio designed to keep the bed hot. This change consisted of substituting large lump coal for a portion of the coke on each charge and jumping the weights of the charges from 250 to 500 pounds. The larger charge, of course, carried with it a corresponding increase in fuel which, due to the coal used, retains its life until well below the melting line, thus preserving the life of the bed and keeping the melting zone in the proper place. This change enabled us to keep a continuous stream during a full working day. This was kept up for several weeks until we found by several slight changes in ratios we could drop bottom in the evening with the cupola in such good condition that very little work was required to put it in shape for the next day's run.

A Record Continuous Run.

During the month of August a large rush order for machine-made sash weights was received and, wishing to make all the speed possible, it was decided to try some real continuous running with our little cupola.

Preparations were made for a day and night gang and on Sunday, Aug. 14, the cupola was relined and baked dry. At 5 o'clock Monday morning the sand bottom was put in and the customary small quantity of wood lighted, on top of which was charged the bed, consisting of 140 pounds of coke and 70 pounds of coal. This brought the level about 12 inches above the top tuyeres. The first charge of iron was then placed, consisting of 300 pounds of No. 2 plain pig and 300 pounds of a mixture of stove plate scrap and our own foundry gate scrap. After the first charge the succeeding charges were preceded by a layer of fuel consisting of 35 pounds of coke and 15 pounds of coal, and were but 500 pounds in weight—250 pounds of pig and 250 pounds of scrap. Each charge carried with it about 15 pounds of limestone as a flux which, while necessary to keep the cupola clean, was rather hard on the lining. Shortly before 7 o'clock the blast was put on, the wind gage showing a variance of from 6 to 8 ounces. Our pressure was obtained from a small rotary fan driven by a motor and regulated by means of the blast gate.

Just as the whistle blew the cupola was tapped out and, amid much note-taking and jesting, our run started. As the day wore on the cupola seemed to do better and better until it began to give us iron that was too hot for our use, so to offset this—beginning with the twentieth charge—the quantity of iron was raised to 600 pounds, the fuel remaining the same. At 6 o'clock the night gang came on and we started in for what we deemed to be a record run.

Progress of the Run.

In all this there was no variation in fuel charging, no coke blank used and the bed kept itself alive without any outside aid whatever. During the night—just after the forty-first charge had been put in—the cupola suddenly slowed down and for a while it looked as though our run was at an end. Investigation showed an evident *hang*, since the last charge was still level with the door and had been so for some few minutes. We waited awhile, hoping it would melt loose when a laborer, on his own initative, seized a sledge hammer and—running upstairs—commenced swinging away at the sides of the cupola. This was hardly a commendable practice—either from a scientific point of view or in the interest of the lining—but it served the purpose and after some few lusty blows it dropped with a rumble, showing some six feet clear from the door. It might be mentioned here that the door is about 15 feet from the bed. From that time on the cupola picked up and was soon running as smooth as ever. At 7 o'clock in the morning the *score* stood at 64 charges, totaling 36,500 pounds, or about 1,520 pounds per hour at a ratio of about 10 pounds of iron to one of fuel.

All day long the cupola continued its good work and when the night gang came on again was still *plugging* away, showing a *score sheet* the resembled a "six-day go-as-you-please." At the 36-hour mark the *score* stood at 97 charges for a total of 56,300 pounds, or about 1,564 pounds per hour at a ratio of 11 pounds of iron to one of fuel.

End of the Run.

Toward daybreak the cupola shell commenced to blister and turn a dull cherry red just above the tuyeres and we knew that we had reached the point where it was only a question of time. We tried hard to keep the cupola going for a full 48 hours, but just at 6:30 the shell suddenly turned to a white heat and we lost no time in getting the bottom down. This gave us an absolutely continuous run of 47½ hours with no stops and without the use of coke or fuel blanks, with the charging level always at the door. The *score* stood at 126 charges, totaling 71,800 pounds at a rate of 1,511 pounds per hour and at a ratio of 11 pounds of iron to one of fuel.

Knowing the lining was in too bad a condition to necessitate any care we turned the fire hose into the cupola and within three-fourths of an hour had a man inside chipping out. The cupola was stripped to the first ring just above the melting line and relined as before, then without the precaution of drying was fired up and—preserving the same order and ratios as before—started off a few minutes after 12 o'clock on Wednesday for a second run.

This second run was almost identical with the first, except the melting was rather slow and sluggish at first, probably due to the *green* lining. In duration, our second run lasted until a few minutes of 2 o'clock Friday afternoon, giving a total of 49½ hours of continuous running for a total of 128 charges of 73,000 pounds at a rate of 1,475 pounds per hour and at a ratio of 11 pounds of iron to one of fuel.

As a grand total we operated our little cupola for 97 hours out of 103 and melted a total of 144,800 pounds, or about 72 tons at a rate of approximately ¾ ton per hour at a fuel ratio of 11 to one. Needless to say we turned out our *rush* order with some time to spare.

Large Boiler Plates

A report from Glasgow is to the effect that British steelmakers are now rolling boiler plate up to 31 feet 7 inches long, 12 feet 5¼ inches wide and weighing over 21,000 pounds. This corresponds to a thickness of over 1¼ inches. The length and width can, of course, be varied and a greater thickness obtained and it is therefore now possible to build quite large, single-ended boilers for fairly high pressure with only two plates in the shell. The extras added on these plates to cover the cost of equipment and risk of breakage of machinery are said to have run the cost up to $94 per ton of 2,240 pounds. Some of the more recently built mills in the United States have a capacity for even greater widths and it is reported that the United States Steel Corporation is considering a 160 or 166-inch mill for its Gary, Ind., plant, but plates of the weight and dimensions noted have not yet been offered to the trade.

Brazil's Iron Ore Supply

The Iron and Coal Trades Review announces a development which seems certain to exercise profound influence on future supplies of iron ore, particularly on ore that is suitable for the manufacture of hematite pig for the acid open-hearth process. A strong English company, in which a number of ironmasters are interested has, secured large iron ore deposits in Brazil, and is making arrangements for their mining and shipment to England on an extensive scale.

The departure is one of first rate importance in many ways. In the first place the quantities involved are sufficient to guarantee for very many years a sufficient supply of a very high class hematite iron ore. In recent years a good deal has been said as to the scarcity of ores suitable for the acid process; indeed, as to a scarcity of iron ores generally. Be this as it may, the really large deposits which have been opened out in recent years have been mainly deposits suitable for the basic process. There is of course nothing new in Brazilian iron ore. For many years that country has been known to possess very rich deposits, and for those who had no previous knowledge, a paper read before the Iron and Steel Institute some years ago by Herbert Kilburn Scott fully explained the situation. The deposits described by Mr. Scott, were, however, mostly situated at inaccessible points, and were all commercially impossible on account of great distances from the coast.

The deposits of Itabria do Matto Dentro are in a different part of the State of Minas Geraes to those described by Mr. Scott. They obtain access to the coast at Port Victoria, which is situated north of Rio de Janeiro. An English company has secured the freehold of these mines, which certainly contain some 60 to 70 million tons of ore, and will, in the opinion of experts, be found eventually to contain anything from 500 million to 1,000 million tons of ore. These latter figures are mere conjectures, and depend on the extension of visible ore bodies below ground, but this is practically a certainty—60 to 70 million tons of ore practically without removing over-burden, give possibilities for the extension of the ore bodies which are almost too immense to be realized.

Even more remarkable is the extraordinary quality of the ore. Many millions of tons run from 69.3 to 69.8 per cent of iron, 0.10 per cent of silica, 0.004 to 0.01 per cent of phosphorus, and 0.016 per cent of sulphur, with almost no moisture. This is practically pure iron oxide.

The company owning these deposits has left no stone unturned to secure success. It has made agreements with the port authorities for harbor dues, and with the railway company for freight rates. The extension of the railway to the mines, a distance of some 60 miles, has already been arranged, and the contract for the electrification and the equipment of the line to carry a minimum of two million tons a year to the coast is in the hands of a British firm, Dick, Kerr & Co., Ltd. The port is admirably adapted for deep water quays, and estimates as to the cost of landing the ore in England, made after due consultation with recognized mining, railway and shipping experts, put the price at considerably less than present quotations for ordinary 50 per cent Spanish rubio. The quarrying of the ore, for many years at any rate, will be a very simple proposition, and the estimated cost of putting it on wagons is between 1s and 1s 9d per ton.

It is interesting to state that a contract for the sale of these deposits to their British owners was concluded only a few hours in advance of the arrival of a mining engineer from the United States, who was prepared to negotiate for their purchase on behalf of American capitalists.

SCOTT'S NEW TOOL ROOM FORGE.

A New Tool Room Furnace

The illustration shows a furnace designed particularly for taking high heats on moderate sized tools and adapted especially to tool room use. The heating chamber is 4½ x 9 inches with an entrance 3 x 5 inches.

The chief advantage claimed for this furnace, which is designed for the use of gas as fuel, is that the extreme high heat can be taken on finished tools without scaling or blistering and at a very low fuel cost. The furnace has been designed by C. U. Scott, Davenport, Ia., a specialist in working and treating tool steel and in designing furnaces for the purpose and who states that he hardened tools in this furnace which cut 0.1 carbon steel at 280 feet per minute with a 1-16-inch cut and 3-64-inch feed and yet could be bent cold after hardening.

New Publications

WASHING AND COKING TESTS OF COAL. By A. W. Belden, G. R. Delamater, J. W. Groves and K. M. Way. Washington, D. C. Distributed by the Bureau of Mines, Department of the Interior, as Bulletin No. 5. 62 6 x 9-inch pages. Deals with tests of coal at the fuel testing plant, Denver, Colo.

THE MONROE FORMATION OF SOUTHERN MICHIGAN AND ADJOINING REGIONS. By A. W. Grabau and W. H. Scherzer. 248 pages. Issued as publication No. 2 of Geological Series No. 1, by Michigan Geological and Biological Survey, Lansing, Mich.

THE DEPARTMENT OF MINES OF CANADA: ITS ORGANIZATION AND WORK. By Alfred W. G. Wilson. Reprinted from *Economic Geology*, October, 1910. 12 7 x 10-inch pages. Distributed by the Department of Mines, Canada.

"THE PRODUCTION OF TALC AND SOAP STONE IN 1909." By J. S. Diller. Advance chapter from "Mineral Resources of the United States, Calendar Year 1909." Distributed gratis by United States Geological Survey, Washington.

"THE EFFECT OF KEYWAYS ON THE STRENGTH OF SHAFTS." By Herbert F. Moore. Bulletin No. 42, Engineering Experiment Station, University of Illinois. Distributed by Engineering Experiment Station, University of Illinois, Urbana, Ill.

"NORTH DAKOTA LIGNITE AS A FUEL FOR POWER PLANT BOILERS." By D. T. Randell and Henry Kreisinger. Bulletin No. 2, Bureau of Mines. Distributed gratis by Bureau of Mines, Washington.

"THE PRODUCTION OF ASBESTOS IN 1909." By J. S. Diller. Advance chapter from "Mineral Resources of the United States, Calendar Year 1909." Distributed gratis by United States Geological Survey, Washington.

THE PRODUCTION OF PETROLEUM IN 1909. By David T. Day. Washington, D. C. Distributed by the United States Geological Survey, Department of the Interior. 130 6 x 9-inch pages.

THE PRODUCTION OF CEMENT, LIME, CLAY PRODUCTS AND STRUCTURAL MATERIALS IN CANADA DURING 1909. By John McLeish, B. A. Ottawa, Can., Department of Mines. 48 6½ x 9½-inch pages.

Judging Malleable Cast Iron by Its Fracture

The Characteristics of Malleable Fractures and the Stories They Tell of Over and Under-Annealing, High and Low Silicon, etc.

By Richard Moldenke

In gray iron practice, judging by fracture is so misleading as regards the value of the mtal for melting purposes, that chemical analysis has practically superseded this method. Even for scrap, the fracture indications are not entirely conclusive, as artificial cooling of the metal by chills, unduly damp sand, or the reverse condition of the metal resulting from very heavy sections, make these unreliable. With *malleable* this is not the case, as the annealing process, if carried out properly, leaves the castings in their final form with a composition between pretty close limits. If not of proper composition, or not properly annealed, the fracture at once indicates this. It is, therefore, quite proper to judge a malleable casting by its fracture to determine whether it may be allowed to go out into service or not.

The characteristics of malleable fractures are not mastered in a day, and indeed these have changed very much from the old charcoal iron castings with only pig and sprues, to the work made today, in which steel, annealed scrap, and even gray iron enter as an admixture. A classification of these fractures, and a description of the accompanying illustrations, will aid in drawing conclusions that will help in overcoming troubles. Unfortunately, it is very difficult to photograph a fracture so that it will show what is intended to be brought out. The surfaces are very irregular, and the light values, owing to shadows, are almost impossible to catch properly. However, the manufacturer of malleable castings, for whom, after all, this description is intended, will know just what is meant, by going over his collection of *cripples* which, unfortunately, every one makes occasionally. The description of these fractures is, of course, intended to apply in the manufacture of the so-called *black-heart*, or American variety of malleable castings.

Fractures will either be black, white, or a combination of the two. Taking the white fractures first, these will be found to consist of metal that has either not been annealed at all, or is very much in the first stages of carbon change; or the castings have been what may be called *over-annealed*, which means that they were annealed to a black fracture and this has been changed to white again by exposure to higher than the proper temperature. This, as stated in previous articles, means that if the anneal at this unduly high temperature could have been interrupted, the castings might have been satisfactory, as short anneals at several hundred degrees above the normal give the same results—almost—as the usual long anneal at the proper heat.

White fractures, arising from not being annealed, may be again divided into those which are crystalline, of irregular, breaking surfaces, in fact the counterpart of the hard casting, and those which have their crystalline structure destroyed. The former will be rarely seen in a malleable works, as long continuance in the ovens will leave a change sufficient to wipe out nearly all of the distinct crystalline structure of the hard casting, while yet being white or at least very much like a piece of oxidized silverware, though not smooth. Such a piece, ¾ inch square (the photographs were all enlarged somewhat), is shown at *A*, Fig. 1 . It will be noted that the crystalline structure characteristic of chilled white iron has disappeared. The piece is silvery, but no longer white, and a few, very small points of temper carbon have made their appearance. To illustrate the difficulty of obtaining a good photograph, it should be pointed out that the indistinct portion at the right is almost ¼ inch lower than the general level of the high points.

In *B*, Fig. 1, the carbon change will be seen to have gone further. The fracture is already a light gray. The surface is still very irregular, and along the bottom line will be seen a series of depressions, showing a tearing out of parts of the structure of the piece, which fractured first along the top and finally broke over. Both pieces are as weak as white cast iron, the latter, however, being much stronger than the first.

The annealing process advanced to a point where the next day would show the beginning of the black-heart, is illustrated at *C*, Fig. 1. It still belongs to the *white* class of fractures, though deep gray, and the fracture surface is already nearly flat.

An interesting fracture is shown at *D*, Fig. 1. With the exception of the rim around three sides, the fracture is similar to *C*, and its position in the scale of anneal is identical with this. However, the rim shown on the top and two sides, and a little over 1/16 inch wide on the sample—or just the band of crystalline structure in the original hard state, where these crystals are at right angles to the surface—is distinctly of a character of quenched tool steel. Here, evidently, in some way, the iron drawn too hot from the oven, was ex-

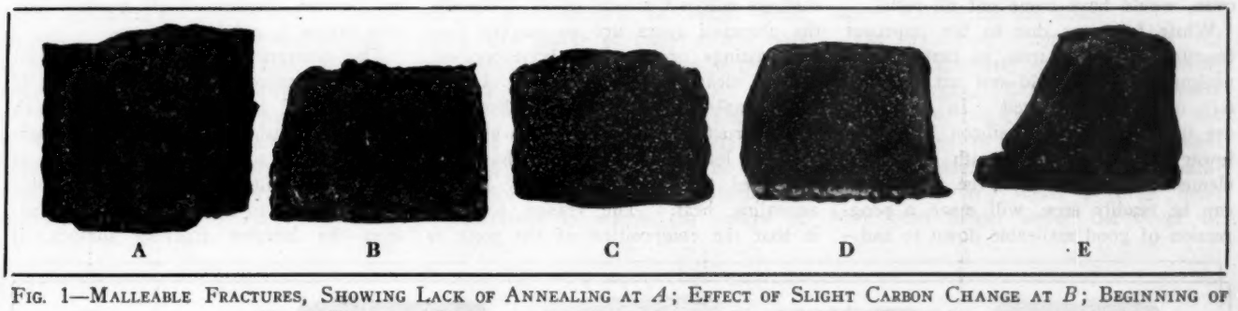


FIG. 1—MALLEABLE FRACTURES, SHOWING LACK OF ANNEALING AT *A*; EFFECT OF SLIGHT CARBON CHANGE AT *B*; BEGINNING OF THE BLACK-HEART AT *C*; CRYSTALLINE STRUCTURE OF BAND AROUND THREE SIDES AT *D*, AND HONEYCOMBED MALLEABLE AT *E*

posed to sudden cooling influences, sufficient, however, only to affect this regular band of original crystal structure. The total carbon was evidently lowered considerably below the center, and hence the quenching effect is quite marked. That it is not very hard, however, is shown by the lower rim, which shows crushing and shearing effects, as the test plug of the coupler was bent over in breaking it off.

Attention should be called to the fact that these four pieces, representing good malleable stock, if returned to the annealing oven, and given another run, preferably in the cooler sections of the oven, would have come out all right.

White fractures due to the improper constitution of the iron, so that the annealing process would not act upon it, will next be considered. In this class are irons that contain silicon below the lower limit of safety, with the other elements as they should be. This, as can be readily seen, will mean a progression of good malleable down to bad—which will be shown later—and iron which has the proper ordinary constituents, but has become oxidized in the melting furnace. Taking the latter case, the effect of undue oxidation of the bath is shown in its first stages by the *mushy* fracture appearance of the test piece taken before tapping. There is no longer the fine, silky, crystalline structure radiating from the center. It is true that this is also partly destroyed when the total carbon runs down, as the melting point, being up, the piece sets quicker, comparatively speaking. However, even this *mushy* iron will anneal. The next stage is indicated when the rim of the *tester* has pin holes, showing plainly that the metal has absorbed gases which develop in setting. This is usually coincident with a dropping in the silicon below the danger line, for with the proper composition of the charge, if the furnace is working all right, there should be no oxidation to speak of by the time the bath is ready to tap. When the heat is kept in the furnace too long, these pin holes appear, and the castings begin to develop annealing difficulties.

The final stage is reached when the castings will not anneal at all. Usually the absorbed gases are so marked that the castings are actually honeycombed. This is clearly shown at *E*, Fig. 1. In this sample, in spite of an absolutely unfit structure, the original white of what is left of the fracture, has been converted to a very light gray by the annealing heat. The reason for this is that the composition of the piece is still within the proper limits of chemical composition, so far as the silicon is concerned. This is also shown somewhat by the brightness of the blow-hole surfaces, where they had no access to the outer air. In very low silicon pieces the honeycombing is usually so bad that nearly all the holes are connected and become oxidized or black on the surface. If, therefore, this metal had not been contaminated by dissolved oxides of some kind—likely by burnt metal in the charge or from the furnace bottom—it would have annealed satisfactorily. If the total carbon is high enough, has a fine, velvety appearance, and no indications of interior shrinkage. Nevertheless, these pieces are not as strong as the first two, with the silicon about 0.40 per cent, and in which the light spots are the reflections of crystals of minute size torn asunder in the breaking. The lower rim in *F* shows how badly the piece was sheared in turning over as it finally broke loose from the coupler to which it was attached as a test lug.

In Fig. 2, *J*, and *K*, *L*, *M* and *N*, Fig.

of improper composition, the change to gray by the annealing heat would not have taken place.

We come now to the series of fractures, beginning with good malleable and shading to poor material by reason of a lowering of the silicon, but not undue oxidation in the melting. Here the array of crystals, perpendicular to the surface, becomes deeper as the silicon goes down, and the effect of the anneal is to burn these crystals to some extent—together with removing the carbon between them—if that is the proper explanation. In other words, the castings get a wider and wider rim of white, and become correspondingly weaker. The iron begins to get *high*.

The fracture appearance of excellent malleable castings is shown at *F*, *G*, *H* and *I*, Fig. 2, the last two, perhaps, with the rim a little too wide. It is characteristic of such pieces, that just as the lower limit of silicon is reached—these happen to have 0.31 per cent silicon—the interior fracture surface, if

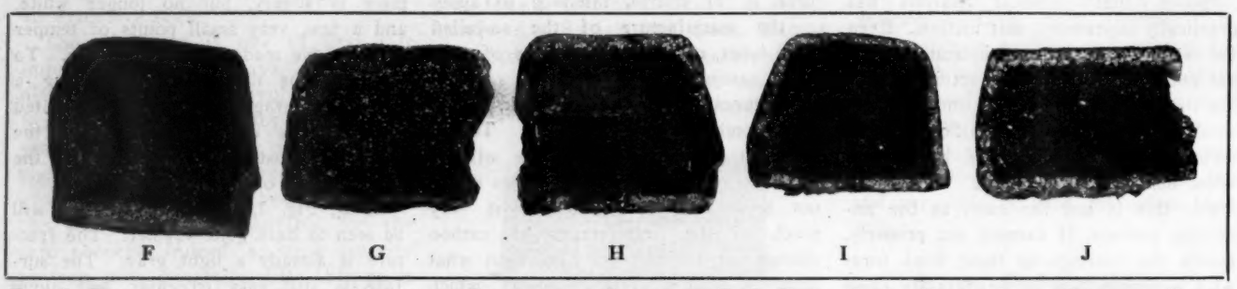


FIG. 2—FRACTURES OF EXCELLENT MALLEABLE CASTINGS ARE SHOWN AT *F*, *G*, *H* AND *I*. IN *H* AND *I*, THE RIM IS A TRIFLE WIDE; *J* ILLUSTRATES THE BEGINNING OF THE DOWNWARD PROGRESSION OF THE SILICON

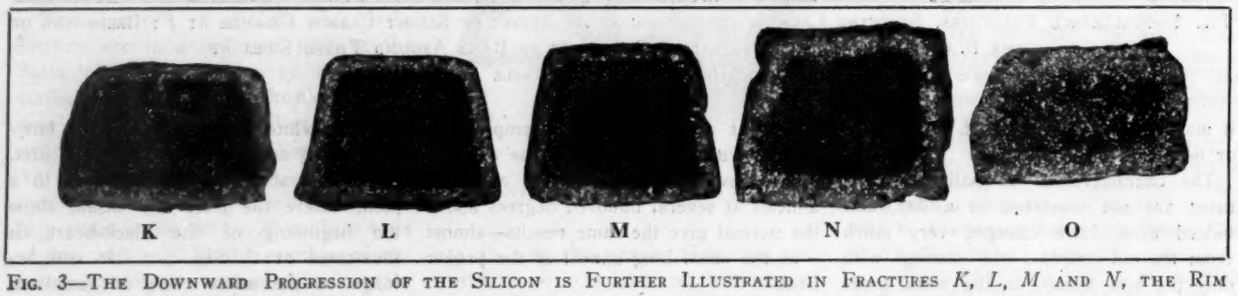


FIG. 3—THE DOWNWARD PROGRESSION OF THE SILICON IS FURTHER ILLUSTRATED IN FRACTURES *K*, *L*, *M* AND *N*, THE RIM GRADUALLY INCREASING IN THICKNESS

3, show the downward progression of the silicon with the accompanying increase in the width of the rim, the last two even showing pin holes on the edges. Only the fracture, *J*, shows a solid interior of fine black, *K* and *L* having the odd characteristic of the white rim, then a fine black space between the rim and center. The center in these two specimens is quite strong, as it shows up badly when torn apart; *M* and *N* have very bad centers, the structure evidently becoming so open after the manner of steel, and ferrosilicon was used to *dope* them back to the proper silicon before tapping.

Necessarily, the normal temperature of annealing would be very trying to this kind of metal, which, even if perfectly annealed, is considerably weaker than metal made properly. The fractures invariably indicate the creeping inward of the white exterior portions, but not with sharply defined limits strictly parallel to the outer edges. The white portion of this class of fractures is for who knows how many hours, left a most disreputable collection of wilted *saggers*, melted *scale* inclusions and burnt castings unfit to use.

The last set of fractures which are met with in the malleable shop, and are dreaded most of all, are the so-called *low* fractures, and result from graphite separation in the hard castings. In other words, the hard castings were gray iron instead of white. The open structure, thus exposed to a high temperature for a long period, absolutely

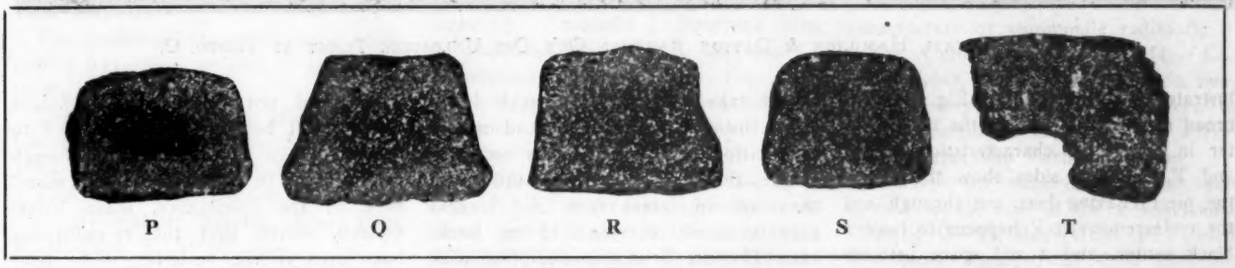


FIG. 4—FRACTURES OF MALLEABLE IRON, SHOWING THE RESULTS OF OVER-ANNEALING

that the metal within was oxidized by penetrating oxygen from the annealing gases.

We come now to the second class of white fractures, those produced by over-annealing. Here the metal was originally annealed to black-heart malleable, but either the annealing temperature was too high, or the structure was too open, so that at what would otherwise have been the proper temperature, the oxidation of the metal was effected by a direct burning in the anneal. The probability is that both causes came to play in this series. The structure was too open evidently because the metal was slightly oxidized in the melting to start with, the heats having been held too long. At the time these were made, a steel melter had charge of the furnaces with the result that heats which should have been completed—between charging and tapping—in 2½ hours, often ran up to five hours, the open-hearth furnace being used. Instead of being charged correctly and rabbled well, the heats were allowed to simmer along highly crystalline, but, unfortunately, like that of a badly burned steel. The progression with practically a constant composition, but increasing annealing temperatures, as taken from cooler and hotter portions of the pots and ovens, can be nicely seen at *O*, Fig. 3, and *P*, *Q*, *R* and *S*, Fig. 4.

At *T*, Fig. 4, and *U* and *V*, Fig. 5, we have the extreme cases of metal burnt in the annealing process. The photographs do not show up the characteristic crystallization in which the facets of some of the crystals are over ⅛ inch across. The light spots in *V* give the best indications, for they are the mirror reflections of crystals of this kind, being oblique to the camera. It may be of interest to note that these particular pieces came from some 20 annealing ovens, the contents of which were ruined in a single night, when the watchman took a notion to sample a neighboring *speak-easy*. The natural gas used for firing fluctuated considerably in pressure at that time of the year, and the burning of large volumes of this rich fuel, rots the metal—if such an expression can be used. It is weaker than the worst kind of gray iron, castings coming from the anneal often breaking by merely falling on the floor.

The oxidation extends through the metal, but strangely not leaving it white, but dark gray. Evidently the graphite protects the iron crystals somewhat, not allowing them to be acted upon like steel under the same conditions of temperature. That the metal portions must have been bright under the cover of graphite, and that the structure has varying degrees of permeability to gases, is shown by the fact that castings of this kind, broken when still hot from the anneal, exhibit beautiful color effects—the colors seen in tempering steel—and these colors in distinct bands. The iron, therefore, is given the name of *calico* iron for a good reason.

This desperately bad material, which results simply from letting the silicon go too high in work of ordinary thickness, or from forgetting to apply chills for exceptionally heavy sections, is il-

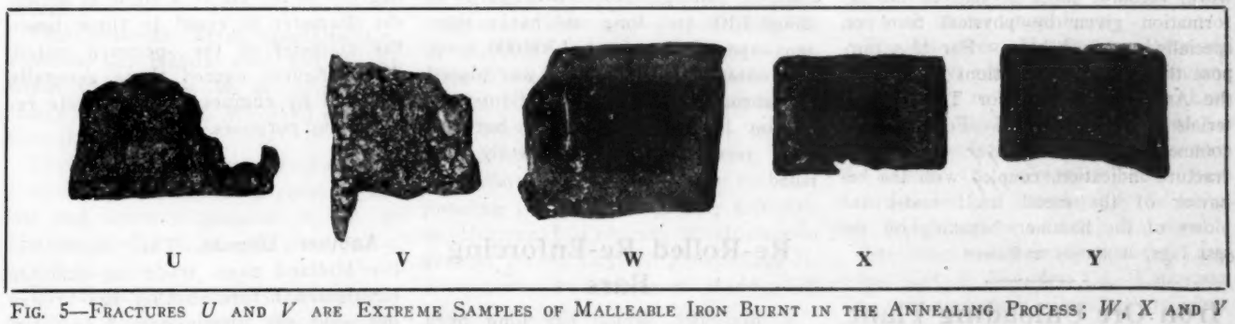


FIG. 5—FRACTURES *U* AND *V* ARE EXTREME SAMPLES OF MALLEABLE IRON BURNT IN THE ANNEALING PROCESS; *W*, *X* AND *Y* ARE FRACTURES OF AN EXCEEDINGLY POOR MALLEABLE, RESULTING FROM HIGH SILICON

THE CINCINNATI, HAMILTON & DAYTON RAILROAD CO.'S ORE UNLOADING PLANT AT TOLEDO, O.

lustrated at *W*, *X* and *Y*, Fig. 5. The broad rim of gray around the black center in *W* is the characteristic. In *X* and *Y*, only the sides show the bands, the pieces having been cut through and the ends removed; *Y* happens to have a black center, and a red space between the black center and blue rims. The photographs, unfortunately, cannot reproduce this.

As between this *low* iron and the *high* varieties, the malleable man always prefers the latter, though he hopes and works toward avoiding both.

In judging by fracture, a careful inspector always takes into consideration the degree of softness, the bending, and the punishment the piece will stand before breaking, and also how it breaks, whether short or only after repeated pounding. Weak iron may still have a very fine fracture, and hence, in special work, recourse must be had to the information given by physical tests on specially prepared bars. For this purpose the set of specifications adopted by the American Society for Testing Materials is recommended. For ordinary commercial work, however, the proper fracture indication, coupled with the behavior of the metal itself under the blows of the hammer, breaking off the test lugs, is amply sufficient.

Iron Ore Unloading Plant

The Cincinnati, Hamilton & Dayton dock at Toledo, O., contract for the equipment of which was awarded to Wellman-Seaver-Morgan Co., Cleveland, has just been completed and will be ready for operation at the beginning of the navigation season of 1911. This plant, which is illustrated herewith, comprises two unloaders of the Hulett type, an ore-storage bridge and a transforming station. The latter is equipped with a motor generator set for transforming alternating current into direct current and which is provided with a ten-ton fly-wheel which takes care of the peak loads from the dock operations and makes the station load more nearly uniform. While there are but two unloaders they are of latest type and largest capacity built, carrying 15-ton buckets. The ore bridge is equipped with a 10-ton bucket. The dock proper is of reinforced concrete and is one of the most modern on the lakes. Some very fast work is expected from these machines and additional particulars will be given in THE IRON TRADE REVIEW later.

Pickands, Mather & Co., Cleveland, have installed at the Erie railroad yards at Randall, O., a new ore-handling plant, built by Wellman-Seaver-Morgan Co., Cleveland. This plant consists of a new Hulett type, electrically-operated, movable car dumper and an ore-stocking and reclaiming bridge. The ore yard is about 1,100 feet long and has a storage capacity of about 1,500,000 tons. The contract for the plant was placed in February, 1910. It was put into operation in November, 1910, but has only recently been completely finished.

Re-Rolled Re-Enforcing Bars

A prejudice, which has long been entertained, is that against re-enforcing bars, which are rolled from old material. These bars, commonly rolled from old rails, have a high carbon content. A finding of interest to makers and users of such bars is that of the committee which was appointed in Cleveland recently to examine into and report on the causes of the collapse of the Henke building in that city on Nov. 22, 1910. The main cause for the collapse of this building, a four-story and basement re-enforced concrete structure, was given as the condition of the concrete, which had not been given sufficient time to set before being subjected to the weight of the building. Although not included in the official report, members of the committee, when interviewed, stated that the re-enforcing bars used in the building, while bent and greatly distorted as a result of the collapse, showed only a minimum amount of breakage. The bars which were used in this building were high-carbon, re-rolled from old rails.

These high carbon, re-rolled bars are hot-twisted, and not cold-twisted, as is usually the case. Numerous tests made by inspection bureaus show that re-rolled high carbon bars of average size develop a tensile strength of from 80,000 to 95,000 pounds and an elastic limit of 50,000 to 65,000 pounds per square inch, combined with a ductility which will permit bending through 180 degrees to the arc of a circle of which the diameter is equal to three times the diameter of the specimen tested. These figures exceed those generally required by engineers for concrete re-enforcing purposes.

Another Dispute.—The dispute in the Midland chain trade has scarcely terminated before another has broken out, says our Birmingham, Eng., staff correspondent. This is the result of a difficulty in regard to the schedule of prices settled by the trades wages board and relates to what is known as the "hammered" chain branch. The increased rates represent an average advance of between 20 and 30 per cent in wages to the operatives, and the leading manufacturers have already intimated their willingness to pay the increased rate. The trouble arises, as on former occasions, from the difficulty in coming to terms with the small employers known in the trades as "middlemen."

POINTERS ABOUT NEW BUSINESS

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

New Buyers:—

The following manufacturing companies have filed articles of incorporation:

The Western Machine Mfg. Co., Eau Claire, Wis.; $40,000; by P. J. Holm, John H. Holm, and Alonzo Foss.

The Milwaukee Grinder & Specialty Co., Milwaukee; $25,000; Max Paul, R. M. Paul, E. B. Milligan.

The Pacific Sash Weight Foundry, Los Angeles, Cal.; $25,000; by E. C. Wilson, J. W. Begg, and F. A. Buchanan.

The Implement Specialties Co., Ltd., Winnipeg; capital, $80,000; provisional directors: Alex McCurdy, Alex Parker, James McIntosh and others.

The Vulcan Brazing & Machine Co., Camden, N. J.; $10,000; by F. R. Hansell, Philadelphia, George H. B. Martin, and S. C. Seymour, Camden, N. J.

Canadian Motors, Ltd., Galt, Ont.; capital, $250,000; provisional directors: George A. Dobbie, Alexander M. Edwards, Harry F. McKendrick and others.

The National Metal Specialty Co., London, O.; metals, etc.; $50,000; by Clyde C. Thomas, M. B. Armstrong, Harry C. Haines, R. W. Boyd and Eb. Converse.

The R. E. Harryman Machine Co., Louisville, Ky.; $3,000; general repairing and foundry business; by R. E. Harryman, F. A. Cazel and W. J. Goodwin.

The Foundries Co., of Orrville, O.; castings; $10,000; by H. D. Shannon, D. Ed. Seas, George Wendling, H. A. Schnitzer, Benj. Wheeler, R. A. Kinney and B. G. Cope.

The Morton-Heer Co., Portsmouth, O.; manufacturing gasoline and traction engines; $10,000; by Frank E. Adams; Arthur H. Bannon, Henry W. Heer and P. E. Selby.

The Southern Ohio Iron Works, Cincinnati; $10,000; by Charles Bredenfoerder Sr., William Wessling, Chas. W. Bredenfoerder Jr., Lydia Bredenfoerder and Matilda Wessling.

The Fetzer Hardware Co., Cleveland; manufacturing in iron and steel; $10,000; by Otto Fetzer, Michael Fetzer, Lillie M. Fetzer, Edward Morgan, Charles V. Boetcher and Samuel Orr.

W. H. Gooderham, Ltd., Toronto; capital, $40,000; to manufacture and deal in automobiles, etc.; provisional directors: Archibald T. Struthers, Wm. G. Blackstock and Geo. E. McCann.

Canadian Militaire Auto Co., Ltd., Toronto; capital, $100,000; provisional directors: Charles F. Ritchie, Albert E. Knox and others.

The Humphrey Gas Pump Co., Syracuse, N. Y.; internal combustion engines, air and gas compressors, etc.; $1,500,000; Edward N. Trumb, Edward L. Pierce, William B. Cogswell, Syracuse, N. Y.

The Carr-Hamilton Engineering Co., Wheeling, W. Va.; constructing and owning furnaces; $25,000; by W. M. Carr, Bon E. Hamilton, Jacob Loomis, N. C. Hamilton, W. F. Shaffer, all of Wheeling.

The Mora Power Wagon Co., Cleveland; manufacturing and selling power-driven vehicles; $750,000; by Millard H. Nason, Robert P. Abbey, Thomas S. Dunlap, A. T. Hatch, and H. A. Mullen.

Kates & Galdo, Inc., Manhattan, New York City; iron, steel, copper, manganese and metals, etc.; $500,000; by Norman B. Kates, 17 State street, New York City; Manuel Galdo Jr., Ithaca, N. Y.; Adam K. Strickler, 60 Wall street, New York City.

The Lohman Co., Manhattan, New York City; to acquire patent for rust proofing iron and steel, etc.; $100,000; by Herman J. Lohman, 90 Monticello avenue, Jersey City, N. J.; William H. Cole, Corry, Pa., James H. Maddy, 610 West 116th street, New York City.

The Railway Building Co., Manhattan, New York City; railway engineering and construction, railway equipment and supplies; $50,000; by Berkeley C. Austin, Eugene W. Austin, 76 William street; Walter L. Brunnell, 317 West 136th street, all of New York City.

New Construction:—

The Banner Iron Works, St. Louis, has taken out a permit to build a one-story shop at 4620-24 Shaw avenue, estimated to cost $3,000.

The Omaha Structural Steel Co., Omaha, Neb., has begun the construction of a fabricating plant at Forty-eighth and Jones streets.

The Thorp-Hawley Co., Detroit, has let the contract for the erection of a factory building, to be devoted to the manufacture of automobile radiators.

The United States Coil Mfg. Co., Philadelphia, is taking figures on a two-story factory building, 50 x 150 feet, to be constructed at the corner of Fifty-fourth street and Bartram avenue.

A temporary machine shop has been erected on the site of the Pennsylvania Shafting Works, Royersford, Pa., which was badly damaged by fire, Dec. 24. Rebuilding the new plant will be hurried along.

Kirk & Blum will build a new plant for their sheet metal business at Western avenue and York street. Cincinnati. The buildings will be two story, 40 x 150 feet, and of brick construction, costing approximately $15,000.

The Elizabeth City Iron Works & Supply Co., Elizabeth City, N. C., is laying the foundations for three buildings that will replace the frame structure destroyed some weeks ago by fire. The foundations will be concrete and the frame steel. The works will be equipped with modern machinery.

The Vanadium Metals Co., Pittsburg, will shortly remove its New England headquarters to Groton, near New London, Conn., land having been leased for that purpose from the New London Ship & Engine Co. Contracts have been awarded for the erection of the building, which will be of brick and steel.

The statement is made that the Catawissa Car & Foundry Co., Catawissa, Pa., may undertake rebuilding its plant, which was seriously damaged by fire some days ago. The principal owners, L. C. Mensch, C. P. Pfahler and C. J. Fisher, will decide within a few days as to whether rebuilding will be undertaken.

The Portsmouth Steel Co., Portsmouth, O., is planning to erect a corrugating works in connection with its present plant. The local board of trade is considering inducements to offer for the building of the plant at Portsmouth, Wheeling and Martins Ferry having made strong bids for its location in these cities.

The Wire Specialty Works, 549-553 Fulton street, Chicago, which has for

many years manufactured all kinds of wire work and wire forming goods, is starting extensively into the special machinery business. Experienced men who have been making special machinery for many years are being employed, and the shop facilities enlarged. The company expects to be in a position to take care of any kind of special machine, whatever its character or however intricate.

General Industrial:—

The Pioneer Iron & Steel Co., Kansas City, Mo., whose incorporation was recently noted, advises that it is manufacturers' agent and does not contemplate new building at present.

The Cincinnati Iron & Steel Co., of Cincinnati, states that there is absolutely no truth in the rumor that it will buy the sheet mill at Marietta, which is to be sold by the receiver.

The Globe Iron Works, Tacoma, Wash., has certified the election of the following officers: President, J. Banford; vice president, F. A. Nicholson; secretary-treasurer, C. Mathews.

Dawson, Pyles & Putschky, Inc., Fulton, N. Y., dump cars and contractors' supplies, advise that they are not ready as yet to erect a plant, but expect to give out their work by contract until later in the year.

The American Supply & Packing Co., Marinette, Wis., has taken over the business of the Mechanical Supply & Machinery Co., of that city. The new company has added capital and new energy, and plans to do an extensive business.

At a meeting of the stockholders Jan. 20, Crane Co. increased its capital stock from $13,000,000 to $17,000,000, the shares being $100 each. Record of the increase was filed Jan. 24, under the name of R. T. Crane Jr., second vice president, Chicago.

The F. J. Green Engineering Works, Douglas avenue, Racine, Wis., has completed work on its new and modern power plant, including a 100-foot steel stack. A new office and administration building is now under way. A large addition to the factory was finished recently.

The Rome Brass & Copper Co., Rome, N. Y., has filed certificates of the merger of the Rome Tube Co., having taken over the Rome Metal Co. some time ago. It is said that the plant of the Tube company will probably be removed to the works of the Metal company.

The Victor Lamp Co., which recently completed its new factory at Camp Washington, Cincinnati, has been incorporated for the manufacture of automobile lamps with a capital stock of $100,000 by W. J. Corcoran, John L. Corcoran. Edward B. Corcoran, H. B. Kerans and John Calvin.

Stockholders of the Brier Hill Iron & Coal Co., Youngstown, O., have re-elected the following directors and officers: Directors, H. H. Stambaugh, John Tod, David Tod, J. G. Butler Jr., R. C. Steece and W. G. Pollock: Officers, president, Henry H. Stambaugh; vice president, David Tod; secretary, R. C. Steece; general manager, Joseph G. Butler Jr.

The Canadian Malleable Iron & Steel Co., Toronto, has purchased the rights for Canada to the Henderson process for the manufacture of tool steel and has received orders amounting to $22,000. The company is installing two furnaces with oven space of 5 x 10 feet each, and expects to have three double furnaces in operation by March 1.

The American Tool Works Co., Cincinnati, at its recent annual meeting, re-elected the directors and these officers: President, Franklin Alter; vice president and manager, J. B. Doan; treasurer, Harry Luers; secretary, Robert Alter. The company is negotiating for the purchase of the shops of the old Schreiber Iron Works, 58 x 200 feet, on Eggleston avenue, adjoining the American company's present plant.

The stockholders of the Webb City & Carterville Foundry & Machine Works, Webb City, Mo., elected these officers and directors: President, C. E. Mathews; vice president, Thomas McCroskey; general manager, F. B. Loomis: secretary and treasurer, F. W. Kellog; who, with the following, constitute the board of directors: T. F. Coyne, Robert Stewart, I. N. Bonsal, W. F. Spurgin, W. R. Calkins and W. F. Schoenberg.

The following directors were elected at the annual meeting of the Security Steel & Iron Co., Troy, N. Y.: James L. Scott, Cornelius F. Burns, George H. Page, Edgar T. Brackett, Fred H. Baker, Walter P. Butler, Louis P. Emerson, Edward F. Murray and James H. Burns. The board organized by electing these officers: President, Edward T. Brackett; vice president, James L. Scott; treasurer, Cornelius F. Burns; secretary, Daniel P. Norton.

Stock is being moved into the new warehouse of the American Steel & Wire Co., at Fargo, N. D., which was just recently finished. The building is 77 x 122 feet, and is very conveniently equipped. Thirty cars of wire have been placed in it, 37 cars will be transferred from the old warehouse and 80 cars of stock removed from Duluth. The Fargo warehouse is in charge of C. F. Leonard and the territory attached includes the state of North Dakota.

The Knox City Iron Works, Knoxville, Tenn., has been chartered with $25,000 capital by James T. Moore, J. G. Ambrister, F. E. Keener, B. F. Smith, G. F. Eggleston and C. H. Johnson. The company has a plant operating, which includes a main building 50 x 170 feet, two stries, and a warehouse. Last year, those interested in the new concern bought the Clinton Iron Works and recently the Maryville Iron Works, in both instances securing a number of valuable patterns and flasks. The company will manufacture stoves and utensils.

The Agnew Electric Welding Co., Detroit, has changed its name to The Michigan Electric Welding Co., and its location to the corner of Third and Congress streets. The new quarters include a one-story building, 35 x 60 feet, in the rear a two-story building, 25 x 65 feet, and a large store room. Additional machinery equipment has been added and the company is now better prepared than ever to care for its specialties, automobile work, rod and yoke end assemblies, welding of rods, tubes, propeller shafts, etc.

The stockholders of the Eureka Foundry Co., one of the oldest foundry concerns in Cincinnati, recently elected these directors: William H. Merten, Oscar Reimert, George Zeller, Anna Hellman, Emmet H. Daugherty, Henry J. Gosiger, Paul Gosiger, Jacob LeBean and Rudolph Oberding. The directors organized by electing these officers: President, William H. Merten; vice president and treasurer, Oscar Reimert; secretary, Emmet H. Daugherty. The announcement was made that the company will be reorganized and the plant re-habilitated.

Trade Notes:—

Hageman & Broderson Co., manufacturer of H. & B. steam driers, announce that all business pertaining to these driers will hereafter be handled by E. H. Conklin & Co., 149 Broadway, New York City, to which all communications should be addressed.

Fires:—

The works of the Allentown Charcoal & Iron Co., Allentown, Pa., were damaged, Jan. 7, the loss of $1,500 being covered by insurance.

The H. J. Brunner Metal & Machinery Co., Kansas City, Mo., suffered serious damage, Jan. 9, the loss of $50,000 being covered by insurance.

The 10-inch mill of the Hamilton Steel & Iron Co., Ltd., Hamilton, Ont., was badly damaged by fire, Jan. 11. The forge shop was also damaged somewhat.